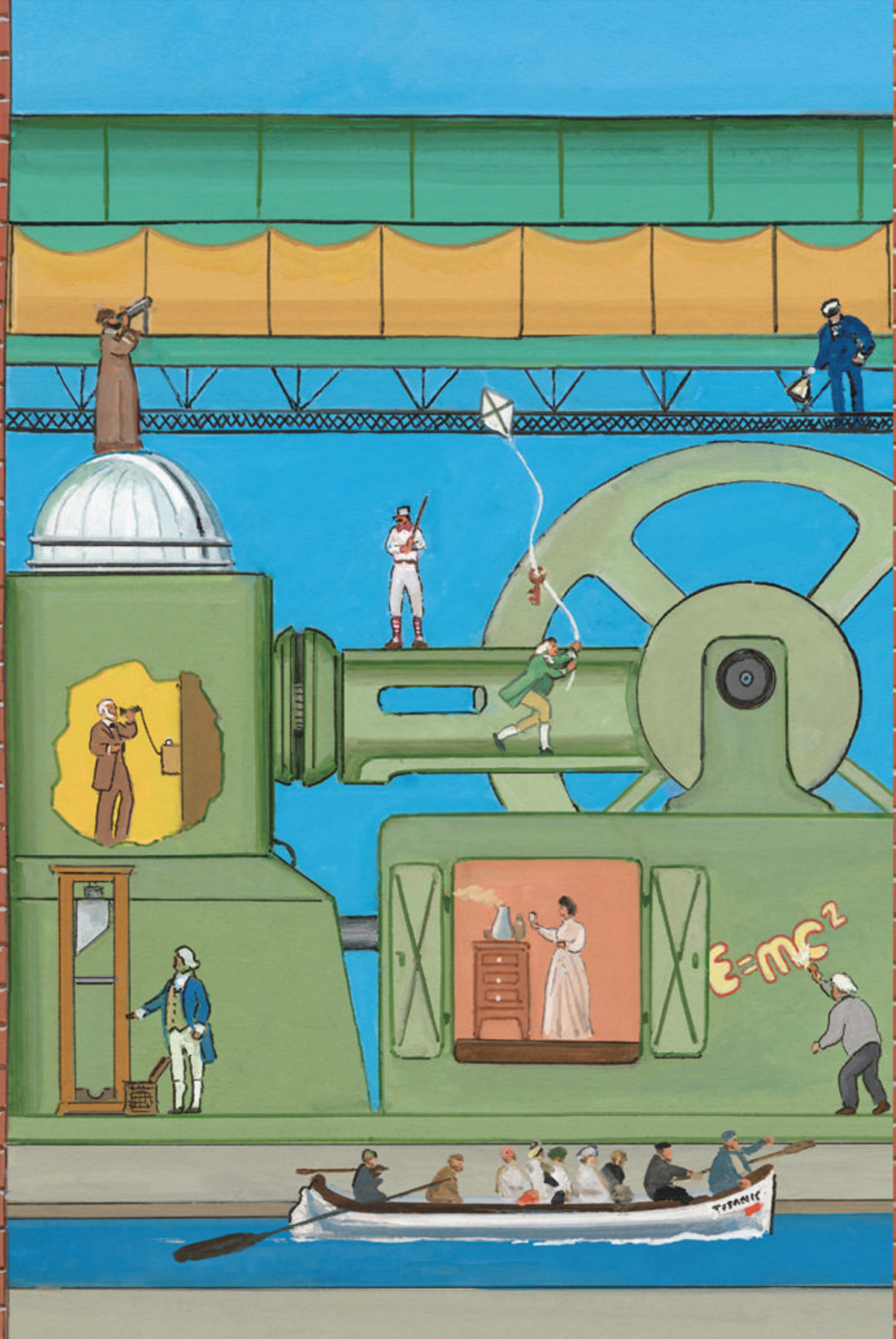
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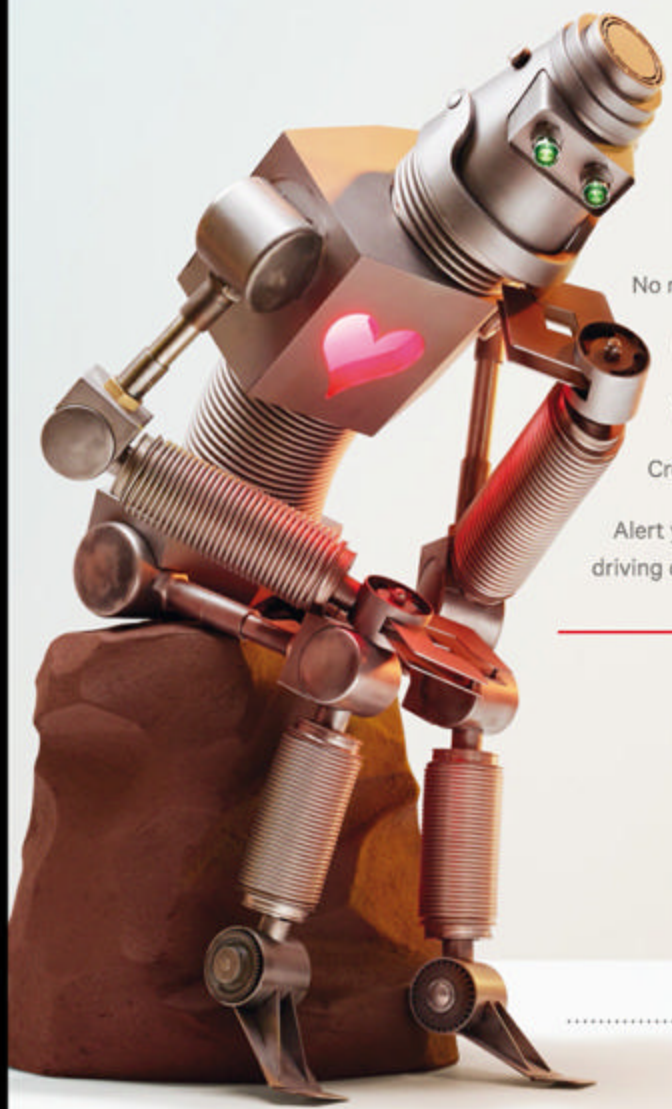
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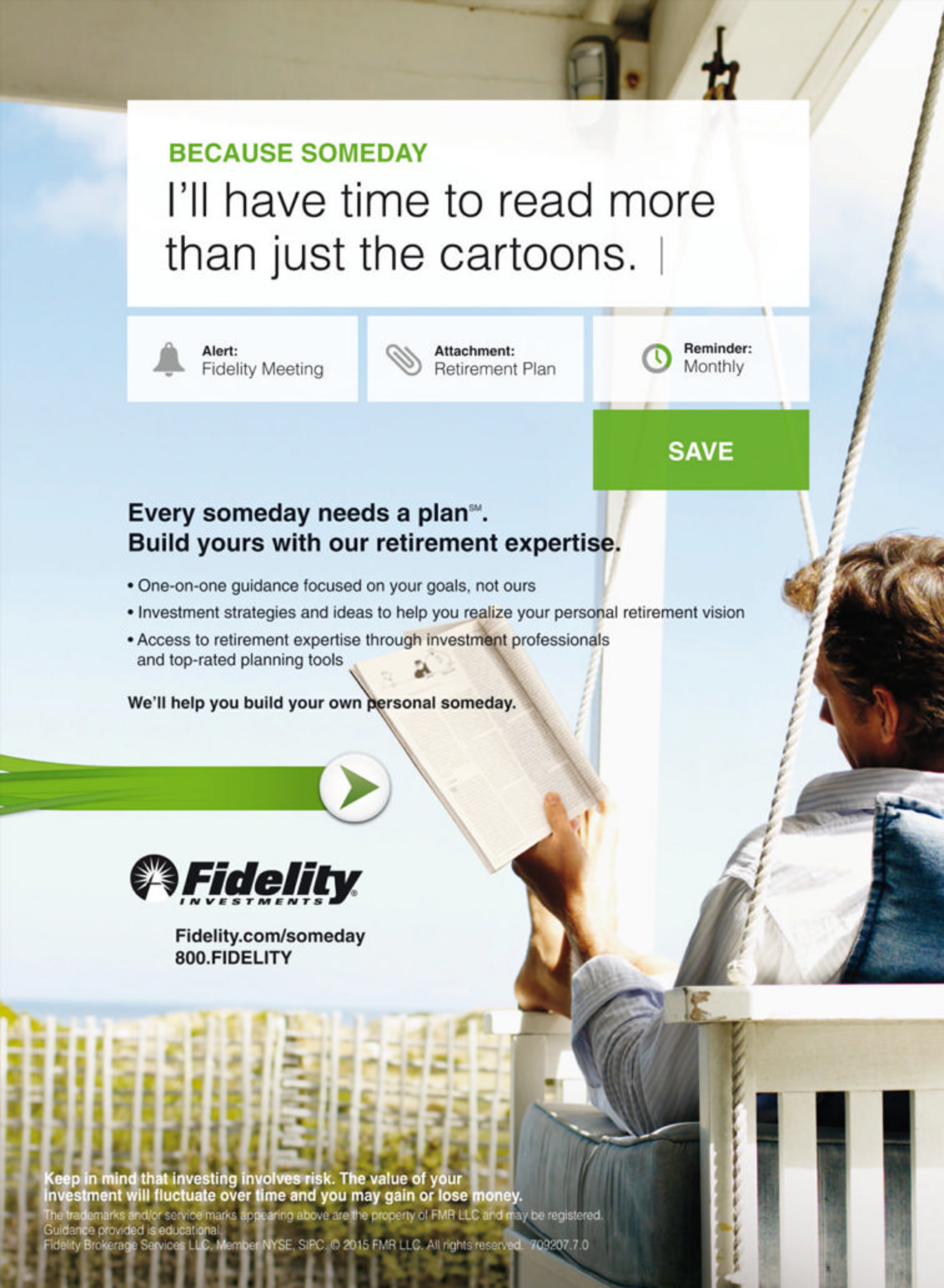
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THE MAIL

EARTHSHAKING

Rivka Galchen documents the reluctance of politicians and people in the oil industry to acknowledge that deep-well-fluid disposal is a near-certain cause of the recent order-of-magnitude increase in seismicity in Oklahoma's oil-producing districts ("Weather Underground," April 13th). In California, where I work as a geology consultant, there is a history of this kind of denial when it comes to oil production. In rural Northern California, exploitation of geothermal steam for electricity was also accompanied by small earthquakes, so many that the pen of the mechanical plotter that was used to record them broke through the plotting paper. This seismic activity came to be accepted by nearby residents, and the operating companies simply adopted a policy of paying for damage when it occurred. Assuming that destructive oil-production practices are not going to stop, a pay-for-damages approach, with encouragement from politicians, could be a good resolution of the problems in Oklahoma and elsewhere. And, as Galchen's article mentions, the level of induced seismicity could be reduced by not using wells drilled into basement rock.

Douglas H. Hamilton
Atherton, Calif.

Galchen's piece on induced seismicity in Oklahoma is worrying. She writes that many large earthquakes are caused by disposal wells, which pump brackish water back into the ground. The average number of earthquakes in Oklahoma with a magnitude of 3.0 or greater has increased almost three hundred per cent in the past seven years. This is an intolerable figure. Galchen also notes that hydraulic fracturing, or fracking, causes small earthquakes. Hydraulic fracturing is indefensible in light of clear geological evidence. In hundreds of communities in the United States, the fracking industry promises a sustainable, ecological energy future, with its drill pads, pipelines, evaporation pools, and water trucks, but this operation also portends an abominable boom-and-bust. The earth is literally trembling under Oklahomans because of fluid injection. The U.S. Geological Survey and the Oklahoma Corporation Commission, among others, have asked for systemic revisions to the natural-gas industry's procedures. Their requests deserve prompt attention.

Zane H. Anthony
Middlebury, Vt.

I live about twelve miles from Pittsburgh International Airport, near where the first of a projected forty-five fracking wells is being drilled. Frackers have bought the oil and gas rights to people's properties, and drilling has been done in Pennsylvania state parks. Years ago, when fracking began in the Pittsburgh area, some of my friends sold the mineral rights to their properties after they were told that everything would be left as they found it on those back-country roads. No one discussed with them poison well water and earthquakes. My property has been in the family since the mid-eighteen-fifties, and no one who lived here ever worried about earthquakes. But, in March, we needed to add earthquake insurance to our homeowner's policy. This is a serious problem for generations to come. The fracking companies here say that the tremors and the earthquakes are not the result of fracking but, rather, of the disposal of the toxic wastewater, so they are not to blame. But it hasn't taken long for the environmental harms to be felt where fracking is already well established.

Dawne Sohn
Moon Township, Pa.

•

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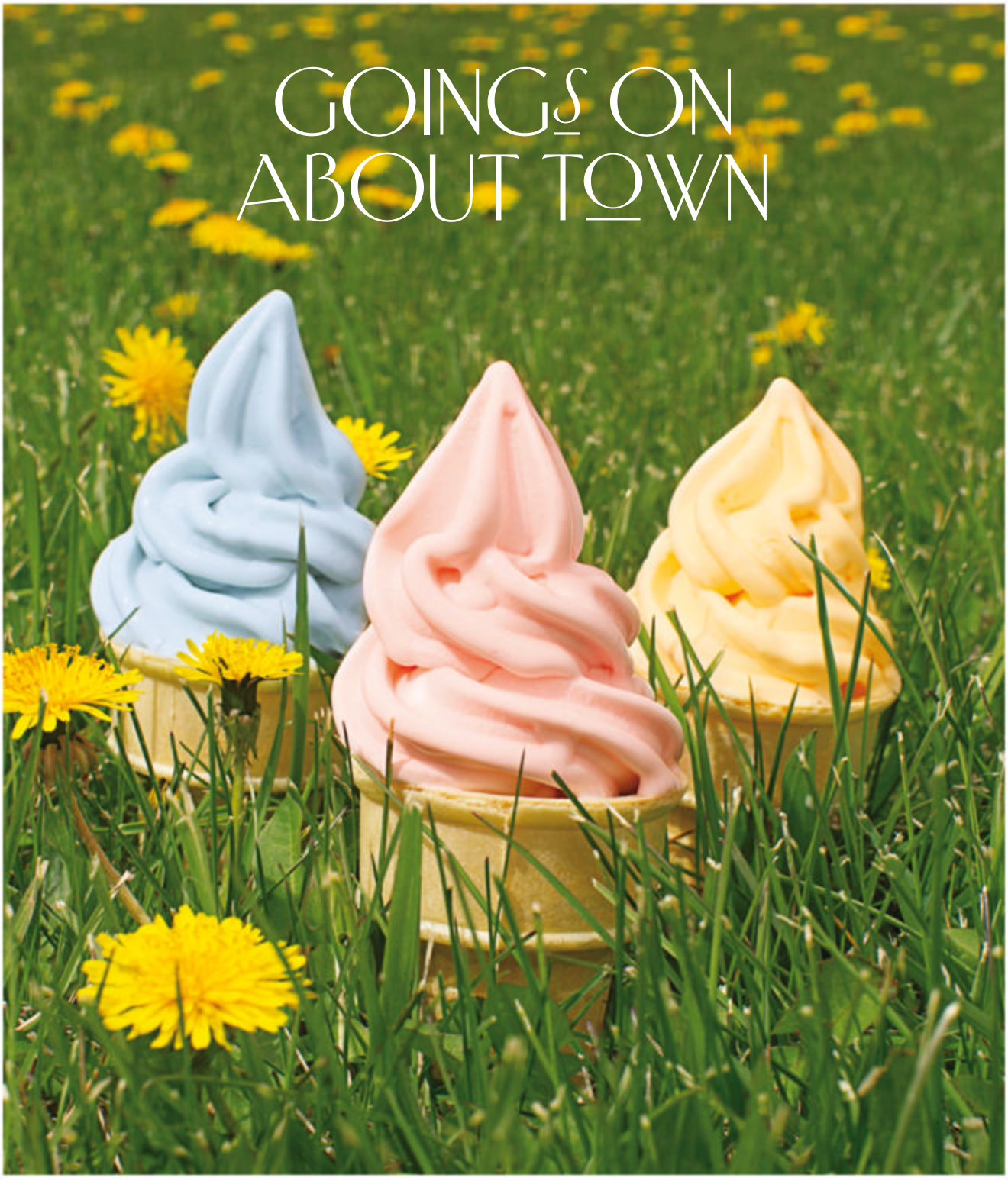
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GOINGS ON ABOUT TOWN



MAY 2015 · WEDNESDAY 13TH · THURSDAY 14TH · FRIDAY 15TH · SATURDAY 16TH · SUNDAY 17TH · MONDAY 18TH · TUESDAY 19TH

CREATIVE TIME and the Central Park Conservancy celebrate the arrival of spring with "Drifting in Daylight," a six-week show of outdoor works by eight artists, installed around the northern end of the Park. Spencer Finch, a New Yorker who interprets light, offers ice cream (above) in colors he derived from a sunset. The Icelandic trickster Ragnar Kjartansson sails his boat, the S.S. Hangover, around the Harlem Meer, with a brass sextet onboard playing a piece composed for the occasion. In "Black Joy in the Hour of Chaos," the interdisciplinary Marc Bamuthi Joseph turns a parachute into a revival tent on the Great Hill. There's even art for the fauna: dangling from lampposts are absurdist nests for athletic birds, by the Brooklynite Nina Katchadourian. Fridays and Saturdays, beginning on May 15.

PHOTOGRAPH BY DAVID BRANDON GEETING

NIGHT LIFE
THE THEATRE | ART
CLASSICAL MUSIC
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FOOD & DRINK

NIGHT LIFE



Mark Mulcahy's group Polaris performs the soundtrack for an eccentric cult comedy about growing up.

KIDS' STUFF

The house band for "The Adventures of Pete & Pete" reunites.

MANY PEOPLE WHO GREW UP during the Clinton Administration have a special part of their souls reserved for "The Adventures of Pete & Pete," a short-lived avant-suburban comedy on Nickelodeon. The whimsical, sometimes bizarre program, set during sick days and hazy summers off, focussed on the fantastical exploits of two carrot-topped brothers named Pete. Both deeply nostalgic and surreal, the show was a hit among kids and their Gen X parents alike, and featured icons like Iggy Pop, Michael Stipe, and, incredibly, the former Symbionese Liberation Army member Patty Hearst. The offbeat action was buoyed by the pop-alt-rock soundtrack composed by Mark Mulcahy, a guitarist and songwriter whose indie-rock band Miracle Legion had just recorded its fifth album when the show premièred, in 1993. Mulcahy formed a new group called Polaris for the series; they recorded twelve tracks in all (four songs per season), the showpiece of which was the sparkling opening-credits theme, "Hey Sandy."

By the mid-nineties, Nickelodeon was shifting toward more mainstream programming, and in 1996 "Pete & Pete" was cancelled. Miracle Legion broke up, and Mulcahy spent a few years performing as a solo artist and writing music for film. "I polished the art of hanging around," he said. "But then I met somebody and fell in love." He married and had twin daughters, and settled in Springfield, Massachusetts. In 2008, his wife, Melissa, died unexpectedly. Soon afterward, many of their friends—including Thom Yorke, Stipe, and Frank Black—recorded reworkings of his music for a benefit album in Melissa's memory, called "Ciao My Shining Star."

Polaris got back together in 2012 for a "Pete & Pete" reunion in Los Angeles, and the response, owing to the cultish appreciation for the show, was huge. Last month, they reissued their songs on vinyl, and they are now on tour, sometimes accompanied by projected footage from the series. The program's twinkling sentimentality is echoed in the music, with Mulcahy's warbling voice flitting along the surface of bright, feathery guitar pop. Mulcahy realized that the concerts exude good vibes; he often sees people in the audience crying with joy. "There are no expectations or responsibilities with Polaris, because it was never a real band," he said. "It's always been anything I've wanted it to be." Polaris comes to the Highline Ballroom on May 15.

—Benjamin Shapiro

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ROCK AND POP

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Faith No More

When this band broke up, in 1998, it left behind a complicated legacy, having given the world such rap-metal hybrids as its 1990 breakthrough hit, "Epic," as well as profoundly challenging albums like "Angel Dust," from 1992. The group cast a long shadow, inspiring sympathetic acts and spawning a raft of inferior imitators. After its demise, the keyboardist Roddy Bottum moved on to the power-pop outfit Imperial Teen, and the restless vocalist Mike Patton did everything from noir-core (Fantômas) to hip-hop (Lovage, with Dan the Automator) and film work ("The Place Beyond the Pines"). In recent years, the band has started playing together again, and it has a new album, "Sol Invictus," a taut, textured, sometimes terrifying reminder of everything that made it great in the first place. (Webster Hall, 125 E. 11th St. 212-353-1600. May 13-14.)

Lightning Bolt

In 1994, two RISD students, Brian Chippendale, who plays drums and sings, and Brian Gibson, who plays bass, formed this experimental noise-rock duo in Providence, Rhode Island, and they have been pursuing an uncompromising sound ever since. Known for their antipathy for many indie-rock conventions, the pair generally prefer improvisation to finished songs and setting up on the floor to being on a stage, and have expressed distaste for the recording process. Recently, the two have softened these stances somewhat, and in March they released an enthralling new album, "Fantasy Empire." Their first record in more than five years, it is a real studio effort, revealing beautiful, abstract sonic details in their music, elements that have been obscured in many of their previous lo-fi releases. All the same, their work is still marked by Gibson's lacerating bass riffs, fed through numerous effects, and the intense, blur-like drumming of Chippendale, who plays with compelling abandon. (The Wick, 260 Meserole St., Brooklyn. 347-338-3612. May 15.)

Los Crema Paraiso

Three Venezuelan musicians who have found success on their own—the drummer and percussionist Neil Ochoa (of Si Se and Chicha Libre), the guitarist and keyboard player José Luis Pardo (of Los Amigos Invisibles), and the electric bassist Álvaro Benavides (from the Pedrito Martinez Group)—filter the sounds of their homeland through influences as diverse as Pink Floyd, Rodgers and Hammerstein, and Tears for Fears (or vice versa, as they've covered "Shine On You Crazy Diamond," "My Favorite Things," and "Everybody Wants to Rule the World"). The group is performing songs from its newly released second record, "De Pelicula!," accompanied by a visual montage of Venezuelan B movies from the seventies, at Subrosa, a new Latin and world-music venue in the meatpacking district, run by the folks behind the Blue Note and the B. B. King Club. Note: Bam Bam Rodriguez replaces Benavides on tour. (63 Gansevoort St. subrosanyc.com. May 12.)

Shelby Lynne

In 2000, this erstwhile country singer with a turbulent past released an album, "I Am Shelby Lynne," that ignited her career. A little bit Memphis soul, a little bit jazz, and a little bit Grand Ole Opry, it delivered her a Grammy (ironically, for Best New Artist, even though her first record came out in 1989). She's on tour now, celebrating the fifteenth anniversary of that record by performing it in its entirety. She'll also be playing songs from "I Can't Imagine," her thirteenth LP, which just came out, and displays her many facets, from R. & B. to roots rock. (The Concert Hall, New York Society for Ethical Culture, 2 W. 64th St. ticketmaster.com. May 14.)

Matt and Kim

The Matt here is Matt Johnson and the Kim is Kim Schifino, and they are a refreshingly uninhibited couple from Brooklyn. Their energetic live shows are full of antics (Johnson, who plays keyboards and sings, stands on his bench; Schifino, who plays drums, gets up on her kit) and their music videos are quirky (in "Lessons Learned," the two strip off all their clothes as they cavort through a chilly Times Square). Their songs fuse synth-pop, hip-hop, punk, and electronica, and are made for dancing. "New Glow," the pair's latest album, is Matt and Kim's most polished effort yet, but their outlook hasn't changed since their self-titled début, in 2006—they just want you to have fun, and they may toss confetti or shoot Silly String at you to prove it. (Terminal 5, 610 W. 56th St. 212-582-6600. May 14-15.)

Red Bull Music Academy Festival New York

Red Bull Music Academy, a gathering of producers and musicians who participate in special performances, lectures, and recording sessions, started in Berlin in 1998. It is now an annual event that moves from city to city (this year, it will be in Paris), and it has spawned intermittent offshoot festivals, such as the one currently underway in New York City. Don't be fooled by the corporate sponsor: this affair taps a deep well of exceptional music. Case in point are the shows this week. May 13: The Japanese noise rocker **Merzbow, Genesis P-Orridge, Aaron Dilloway, Ron Morelli, Pharmakon, Prurient,** and additional experimental heavyweights take over the Brooklyn club Output. May 15: **The Haxan Cloak, Evian Christ, Holy Other, Vessel, Forest Swords,** and other dark, weird, and captivating artists on Tri Angle Records celebrate the label's fifth anniversary with a show in the basement of 23 Wall Street, the former home of J. P. Morgan's bank. May 16: The Brooklyn-born d.j. **Frankie Bones,** who was instrumental in bringing rave culture from the U.K. to the city at the dawn of the nineties, leads a night of New York techno at a warehouse in Brooklyn, just like in the old days. May 17-19: The inimitable **FKA Twigs** presents "Congregata," a free-for-all from the wild side of her imagination, featuring ten dancers and visual elements, at the Brooklyn Hangar, in Sunset Park. (nyc.redbullmusicacademy.com. Through May 30.)

Esperanza Spalding

The jazz bassist and singer shocked many in 2011, when she beat out the likes of Justin Bieber and Drake to take home the Grammy for Best New Artist, a category hitherto reserved for pop musicians. A year later, she released "Radio Music Society," a broad and jubilant collection infused with R. & B., soul, and pop influences that earned her another Grammy, for Best Jazz Vocal Album. In recent years, she's performed with Janelle Monáe and Bruno Mars, and her latest effort, something she's calling "Emily's D+Evolution," is a high-concept project inspired in part by the background of the legendary rock-and-roll drummer Ginger Baker. (Le Poisson Rouge, 158 Bleecker St. 212-505-3474. May 15.)

JAZZ AND STANDARDS

Judy Collins

Collins, who turned seventy-six on May 1st, looks and sounds terrific, and her judicious repertoire reminds us that she has been keen on expanding her stylistic palette since the late sixties. She helped introduce the world to the work of Joni Mitchell and Leonard Cohen, and remains enamored of Sondheim and Jimmy Webb. She displays her many musical sides—and shares tales from her storied past—when she takes the stage at the Café Carlyle. (Carlyle Hotel, Madison Ave. at 76th St. 212-744-1600. Through May 16.)

Guillermo Klein

The big-band tradition is evolving in the hands of the composer, conductor, and pianist Klein. Since his fledgling days, in the early nineties, at Smalls, the aptly named beloved West Village club, the Argentine-born Klein has been leading large ensembles that flaunt their eclectic nature, layering post-bop tropes with generous additions of Latin folk, twisted funk, and classical. His body of work is foundational to the renewed interest in contemporary jazz orchestras. (Village Vanguard, 178 Seventh Ave. S., at 11th St. 212-255-4037. May 12-17.)

Joe Lovano and Dave Douglas Quintet: Sound Prints

The celebratory Wayne Shorter nights at Lincoln Center (see below) include an appearance by this quintet, which brings together the saxophonist Lovano and the trumpeter Douglas. Although Shorter himself has contributed two original compositions to the band (they can be heard on their new release, "Sound Prints: Live at Monterey Jazz Festival"), this isn't a repertory project—the co-leaders opt instead to offer their own Shorter-inspired material. A vivacious rhythm team of the pianist **Lawrence Fields,** the bassist **Linda Oh,** and the drummer **Joey Baron** rounds out this evolving group. (Appel Room, Jazz at Lincoln Center, Broadway at 60th St. 212-721-6500. May 15-16.)

John Patitucci

When he's with the Wayne Shorter quartet, where he's a treasured player, Patitucci applies his prodigious technique and quicksilver responsiveness to the acoustic bass. But his latest solo recording, "Brooklyn," finds the Kings County-born virtuoso plugged in, fronting his Electric Guitar quartet, with **Steve Cardenas** and **Adam Rogers,** as well as the drummer **Brian Blade.** All of them join the leader at Iridium, May 13-16. (1650 Broadway, at 51st St. 212-582-2121.)

Odean Pope Sax Choir

The seventy-six-year-old tenor saxophonist may be best known for his tenure with Max Roach's late-period bands, but he has been leading versions of his Sax Choir for some forty years now. Pope is a maximalist—the group typically has eight brawny horns to its name—and he's including a pair of formidable players in his run at the Blue Note. **James Carter** sits in on the first two nights. **Ravi Coltrane** has the honors on the last two. (131 W. 3rd St. 212-475-8592. May 14-17.)

Wayne Shorter

As close to royalty as jazz has today, the eighty-one-year-old tenor and soprano saxophonist, composer, and bandleader leaves his celebrated quartet home for a special event. As featured soloist with the Jazz at Lincoln Center Orchestra, he will draw on original work from his historic sixties association with Miles Davis and his own vaunted recordings as a leader. If the orchestrated versions of his compositions maintain room for the master to express himself, these will be beautiful nights. (Rose Theatre, Broadway at 60th St. 212-721-6500. May 14-16.)



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U.S. TRUST
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The downtown company re-creates the Benjy section of "The Sound and the Fury," at the Public.

SOUTHERN GOTHIC

Elevator Repair Service interprets Faulkner.

SOMETIMES IT TAKES A LONG time to discover what's good for you. Even though the director John Collins founded Elevator Repair Service in 1991, I didn't start following the company until 2008, when they performed their thirteenth full-length piece, "The Sound and the Fury (April Seventh, 1928)," at New York Theatre Workshop. As I recall it, my reluctance to check them out had to do with diversity: I didn't think I could face another New York-based avant-garde company that looked like somebody's Yale fantasy before that august institution went coed. In any case, William Faulkner's 1929 novel, an incredibly beautiful and difficult meditation on family, subjectivity, memory, and the American South, demanded that Collins at least entertain race, I thought, settling into my seat, given Faulkner's ideas about blackness, which were, to say the least, thorny and true and outmoded. Based on a literal translation (actors read the text verbatim) of the first chapter of the book, the show was, I found, anything but literal, certainly when it came to casting: female actors played male characters, white people played blacks, and the conversation crossed over years, through various emotional disturbances and changes of heart.

E.R.S. became better known in 2010, when "Gatz" premièred at the Public. I was interested in the conceit more than the show. Still, there are miracles that certain performers can spin brightly with the support of a precise and loving director. Scott Shepherd starred as an office worker, who, along with the ensemble, recited every word of "The Great Gatsby" as it was acted out by various co-workers, and the grimy action matched Fitzgerald's elegance by showing the ardor beneath both.

Now, nearly eight years after its New York première, E.R.S. is remounting "The Sound and the Fury" at the Public (May 14-June 27). Even if Faulkner isn't your thing, or if confusion of characters and time frames aren't, either, it's important to see the piece, if only to understand how scripts work—and how they transform the actors in the space of the stage. The forty-five-year-old Collins inspires a degree of confidence in his performers that's unusual and that may, at times, feel dangerous—all those words! all that action!—but isn't that the mark of an important theatre artist? Keeping the caravan alight with energy and inspiration?

—Hilton Als

THE THEATRE

OPENINGS AND PREVIEWS

An Act of God
Jim Parsons ("The Big Bang Theory") stars in a play by David Javerbaum, in which God answers some of life's eternal questions. Joe Mantello directs. In previews. (Studio 54, 254 W. 54th St. 212-719-1300.)

The Flick
Annie Baker's Pulitzer Prize-winning play, set in a small-town movie theatre, returns for a downtown run. Sam Gold directs the original cast, Alex Hanna, Louisa Krause, Matthew Maher, and Aaron Clifton Moten. In previews. (Barrow Street Theatre, 27 Barrow St. 212-868-4444.)

The Gondoliers
New York Gilbert & Sullivan Players, devoted purveyors of operatic parody and pastiche, present the last big hit of Gilbert and Sullivan's partnership. The Venice setting adds a dash of Mediterranean flavor to the pair's usual skewering of Victorian class distinctions and social mores. May 15-17. (N.Y.U. Skirball Center, 566 LaGuardia Pl. 888-611-8183.)

New and Traditional Noh
A double bill of "Holy Mother in Nagasaki," a new play, about a mysterious woman (possibly the Virgin Mary) who appears in the aftermath of the atomic bomb; and "Kiyotsune," a centuries-old Noh drama. In Japanese, with English supertitles. May 14-16. (Japan Society, 333 E. 47th St. 212-715-1258.)

The Other Thing
Second Stage Uptown presents a play by Emily Schwend, directed by Lucie Tiberghien, in which a journalist follows a team of ghost hunters to a haunted barn in Virginia. In previews. (McGinn/Cazale, 2162 Broadway, at 76th St. 212-246-4422.)

Permission
Alex Timbers directs a comedy by Robert Askins ("Hand to God") for MCC Theatre, in which a married couple (Justin Bartha and Elizabeth Reaser) take up Christian Domestic Discipline, a.k.a. "spanking for Jesus." In previews. (Lucille Lortel, 121 Christopher St. 212-352-3101.)

ILLUSTRATION BY MARC ASPINALL

The Spoils
The New Group presents a play written by and starring Jesse Eisenberg, about an angry grad-school dropout who tries to destroy the impending marriage of his grade-school crush. Scott Elliott directs. In previews. (Pershing Square Signature Center, 480 W. 42nd St. 212-279-4200.)

Tuesdays at Tesco's
As part of the "Brits Off Broadway" festival, Simon Callow stars in a play by Emmanuel Darley, directed by Simon Stokes, about a transgender woman struggling to connect with her elderly father. Previews begin May 14. Opens May 19. (59E59, at 59 E. 59th St. 212-279-4200.)

The Way We Get By
Amanda Seyfried and Thomas Sadoski star in a new play by Neil LaBute, directed by Leigh Silverman, as a pair of wedding guests who spend the night together. In previews. Opens May 19. (Second Stage, 305 W. 43rd St. 212-246-4422.)

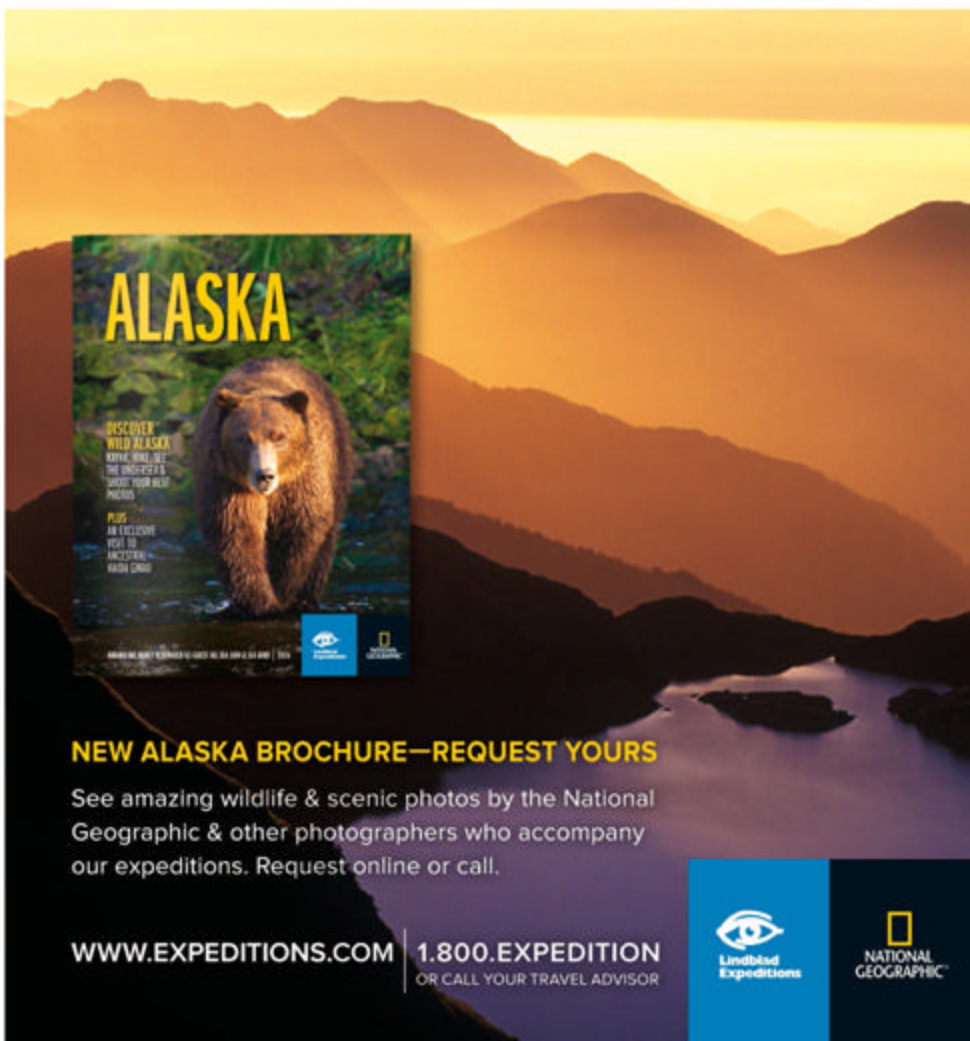
What I Did Last Summer
Jim Simpson directs A. R. Gurney's play, about a woman who takes her teen-age son and daughter to spend the summer on Lake Erie during the Second World War. In previews. Opens May 17. (Pershing Square Signature Center, 480 W. 42nd St. 212-244-7529.)

NOW PLAYING

An American in Paris
Christopher Wheeldon, who is English and was trained in classical ballet, was not a natural choice to direct a quintessentially American show, with an American story and, above all, an American score, featuring George Gershwin's famous 1928 tone poem, together with his wonderful, jazzy songs. The book, by Craig Lucas, gives us basically the same plot as the 1951 movie: Jerry (Robert Fairchild) is a painter who fought in France during the war and fell so much in love with Paris that he couldn't bear to leave when the conflict was over. Then he meets a French girl, Lise (Leanne Cope), and instantly loses his heart. As well as adding sorrow to the story, Wheeldon has given it clarity. On the whole, the show is tasteful, witty, sophisticated, decent-hearted—even lovely, often—and a little mild, a little pale. It is not so much something as a meditation on something. (Reviewed in our issue of 4/20/15.) (Palace, Broadway at 47th St. 877-250-2929.)

Dinner with the Boys
Six months ago, the aging mobsters Dominic and Charlie refused an order to kill their best friend, a hit man named Leo. Their punishment was to cook and eat him. When Dan Lauria's comedy, directed by Frank Megna, begins, Dominic (Richard Zavaglia) and Charlie (Lauria), hiding out together in a house in New Jersey, have developed a taste for mobsters: Charlie grows vegetables with mulch made from their bones, and Dominic prepares exquisite Italian dishes with their flesh. That's the main joke that runs through this good-natured but silly play: Dominic and Charlie are dumb, lovable cannibals who eat, drink wine, and talk over dinner, mostly about what a standup guy Leo was. The other running joke is about how much Dominic loves Charlie's big, hard zucchini. Lauria's repetitive, adolescent humor might have worked in a five-minute "Saturday Night Live" skit, but it's wearying in a two-act play. (Acorn, 410 W. 42nd St. 212-239-6200.)





ALSO NOTABLE

AIRLINE HIGHWAY
Samuel J. Friedman

THE AUDIENCE
Schoenfeld

THE BELLE OF BELFAST
DR2

CLINTON THE MUSICAL
New World Stages

COOL HAND LUKE
59E59

THE CURIOUS INCIDENT OF THE DOG IN THE NIGHT-TIME
Ethel Barrymore

FINDING NEVERLAND
Lunt-Fontanne

FISH IN THE DARK
Cort

FOREVER
New York Theatre Workshop

A GENTLEMAN'S GUIDE TO LOVE AND MURDER
Walter Kerr

GIGI
Neil Simon

GROUNDED
Public

HEDWIG AND THE ANGRY INCH
Belasco

IT SHOULDA BEEN YOU
Brooks Atkinson

IT'S ONLY A PLAY
Jacobs

LET US NOW PRAISE SUSAN SONTAG
Abrons Arts Center. Through May 17.

NIRBHAYA
Lynn Redgrave Theatre. Through May 17.

ON THE TOWN
Lyric

ON THE TWENTIETH CENTURY
American Airlines Theatre

THE PAINTED ROCKS AT REVOLVER CREEK
Pershing Square Signature Center

THE SOUND AND THE FURY
Public

SPEAKEASY DOLLHOUSE: ZIEGFELD'S MIDNIGHT FROLIC
Liberty

THE 39 STEPS
Union Square Theatre

TRASH CUISINE
Ellen Stewart. Through May 17.

THE TWO GENTLEMEN OF VERONA
Polonsky Shakespeare Center

THE VISIT
Lyceum

Fun Home

Based on Alison Bechdel's 2006 graphic memoir, with a book and lyrics by the wise Lisa Kron, this small, personal show is narrated by Alison (Beth Malone), a thin, bespectacled, gay forty-three-year-old cartoonist, who is trying to make sense of her past. Looking back, Alison casts a quizzical, humorous, and empathetic eye on Small Alison (the charming Sydney Lucas), who is periodically picked on by her father, Bruce (Michael Cerveris), a Pennsylvania mortician and schoolteacher conflicted about his homosexual desires. Cerveris plays Bruce's dissatisfaction with prickly charisma: he cannot accept others because he cannot accept himself. And the only way that Alison's mother (Judy Kuhn) can react is by not reacting. Kuhn's performance—the nuances of her rage, bewilderment, and loneliness—is perfectly suited to Jeanine Tesori's score. Just when you think Sam Gold's production will topple over into consciousness-raising "sharing," it rights itself and moves quietly, surely forward. (5/4/15) (Circle in the Square, 235 W. 50th St. 212-239-6200.)

Hand to God

The weird thing about this intermittently entertaining play, by Robert Askins, is that it purports to criticize right-wing Christianity while sharing some of its prejudices. Margery (Geneva Carr), the energetic single mother of a sullen youth named Jason (the brilliant Steven Boyer), is pursued by the smarmy Pastor Greg (Marc Kudisch), who works with her in an after-school arts program. There, Jason, along with Jessica (Sarah Stiles) and Timothy (Michael Oberholtzer), is encouraged to use hand puppets to act out Christian-based stories. But Jason's puppet, Tyrone, cannot be controlled. Blasphemous and hilarious, he says what Jason would never dream of saying. As Jason/Tyrone spews, Margery seems to be taken over by the Devil; she gives in to Timothy's lust. A woman's desires, as usual, are painted as demonic, and she must be punished for them in the end. All this subtext spoils the production, but not Boyer's incredible talent. (Booth, 222 W. 45th St. 212-239-6200.)

The King and I

In Rodgers and Hammerstein's 1951 musical, the King of Siam (Ken Watanabe) wears a scowl on his handsome face for much of the nearly three-hour-long show, because life as he has known it is changing. It's the early eighteen-sixties, and trade is opening up in Asia. The King hires a British tutor, Anna Leonowens (Kelli O'Hara), to teach his children about the larger world, so that they can, perforce, be part of it. A widow with a preternaturally upbeat attitude, Anna is initially unfazed by her new boss's severity. The two are worthy adversaries. They are also, after a fashion, in love. The director, Bartlett Sher, wants the production to be big, to give a sense of space and distance on the stage, through huge props and grand movements. This may be a bid to assert the show's importance, but "The King and I" is already important—delightful and moving and complicated—and creating a larger visual field doesn't really change our response to it. (5/4/15) (Vivian Beaumont, 150 W. 65th St. 212-239-6200.)

Six Rounds of Vengeance

It's reasonably clear why the group Vampire Cowboys makes theatre: its members like to dress up as cartoonish characters, devise outlandish origin stories, and choreograph lengthy sword fights. But it's less obvious what, if anything, an audience stands to gain by attending this show, which amounts to a protracted cosplay session, punctuated by startlingly amateurish combat sequences and the kind of nerdy in-jokes beloved by obsessive consumers of genre entertainments. In six scenes—the playwright Qui Nguyen's title has the virtue of allowing you to estimate how much nonsense remains—the company stages a convoluted geek fantasia, about ragtag vigilantes squaring off against vampire-like monsters in the dystopian desert world of Lost Vegas. Between wearisome battles, the goodies and the baddies narrate complicated backstories. Meanwhile, spectators consult their watches, itching to ride off into the sunset. (New Ohio Theatre, 154 Christopher St. 888-596-1027. Through May 16.)

Skylight

In David Hare's play, directed by Stephen Daldry, Kyra Hollis (Carey Mulligan) is a young woman living in a down-at-heel flat in North London. The time is the early nineteen-nineties, and the world is sharply divided between haves and have-nots. Kyra was the lover of a successful older married man named Tom Sergeant (Bill Nighy), who shows up in a bid to reclaim her. Mulligan is an actress of intention, meaning that she often plays her characters without seeming to understand why they're reacting as they are, and yet we can see the intelligence in their eyes. But sometimes, when Mulligan has too much to say, she is reduced to the unenviable position of being Hare's female mouthpiece. Mulligan is interested in the small spaces—the private moments—of existence; Tom, by contrast, likes watching himself. It's Nighy's show, and he wants us to know it's his show. (4/20/15) (Golden, 252 W. 45th St. 212-239-6200.)

Something Rotten!

From its first jolly showstopper, "Welcome to the Renaissance" ("Our mugs are made of pewter / Our houses are all Tudor"), this new musical—original, nonderivative, and cast with Broadway powerhouses instead of celebrities—is singable, high-spirited fun. In telling the story of the Bottom brothers, Nick (Brian d'Arcy James) and Nigel (John Cariani), who invent the first musical in an effort to compete with Shakespeare (Christian Borle), the real-life brothers Wayne and Karey Kirkpatrick (with John O'Farrell) make Broadway and Bard jokes galore. Borle, enjoying himself tremendously, plays Shakespeare as a glad-handing rock star; Brooks Ashmanskas, as a bumbling, innuendo-slinging Puritan, elevates embarrassed pomposity to an art form. With just a bit more insight, the show could have been brilliant satire, shining a light on our own enlightened age. As is, Casey Nicholaw's production is a fizzy entertainment that gives audiences exactly want they want. (St. James, 246 W. 44th St. 212-239-6200.)

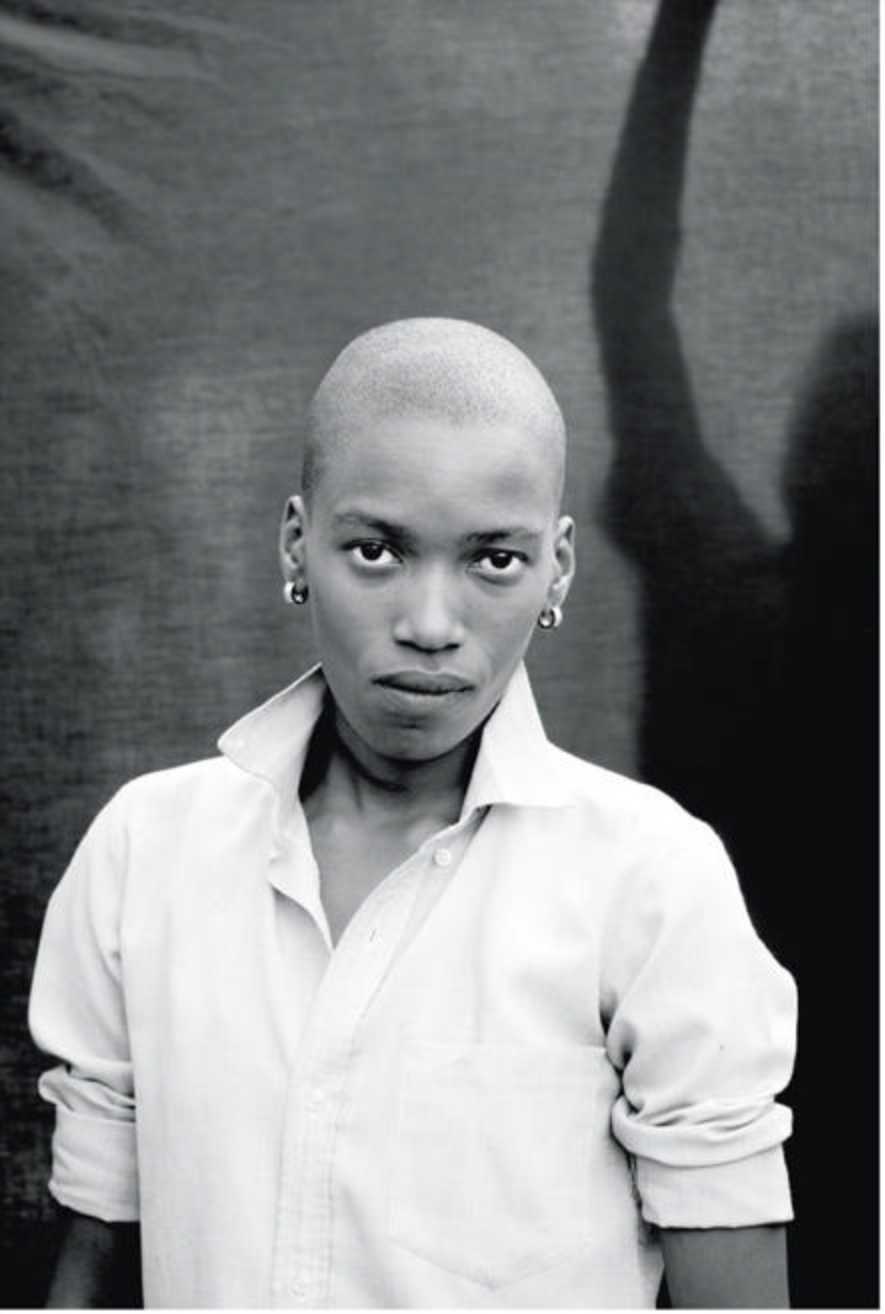
'Tis Pity She's a Whore

Red Bull Theatre presents a luscious and lubricious revival of John Ford's sixteen-thirties shocker, about star-crossed lovers with shared DNA. In Parma, the brilliant Giovanni (Matthew Amendt) longs for the beautiful Annabella (Amelia Pedlow), and she loves him, too. Trouble is, she's his sister. But soon they're rolling in incestuous sheets. Ford's great achievement is brightening a deeply cynical vision of the world with soaring poetry and theatrical thrills. Jesse Berger's production is swift, lucid, and lurid. He urges his actors toward conversational speech and his designers toward punk-Caroline splendor and baroque blood effects, like a human heart dripping from a dagger's blade. But the most startling aspects of the play all owe to Ford. In the final speech, the Cardinal (Rocco Sisto, superb and malign) says, "Never yet / Incest and murder have so strangely met." Nearly four hundred years later, he's still right. (The Duke on 42nd Street, 229 W. 42nd St. 646-223-3010. Through May 16.)

Wolf Hall: Parts One & Two

Steeped in its venerable tradition of enunciation and spectacle, the Royal Shakespeare Company is one of those troupes that keep theatre firmly rooted in nineteenth-century bourgeois standards. This conservative vision contributes to both the pleasure and the dullness of Jeremy Herrin's production, adapted by Mike Poulton from Hilary Mantel's best-selling novels. The acting is all of a piece—perfectly nice, nothing you would confuse with genius—in this nearly six-hour work, set, for the most part, in King Henry VIII's court. Mantel's interest in the ways that consciousness—specifically, religious consciousness—rubs up against the barbarism that made England a world power is explored in scenes that are short and expedient but often humorless. (4/20/15) (Winter Garden, Broadway at 50th St. 212-239-6200.)

OPPOSITE: COURTESY YANCEY RICHARDSON AND STEVENSON, CAPE TOWN/JOHANNESBURG



Nhlanhla Mofokeng photographed by Zanele Muholi in 2012, in Katlehong, Johannesburg.

OUT LOOK

A South African photographer brings her life's work to Brooklyn.

IN 2006, ZANELE MUHOLI, the South African artist—she prefers the term "visual activist"—took a photograph of her friend Busi Sigasa, a poet and political advocate who contracted the H.I.V. virus after being brutally raped by men she considered friends to "cure" her of being lesbian. Sigasa died less than a year after the picture was made. She was twenty-five.

The portrait is the earliest image in Muholi's incandescent "Faces and Phases," an ongoing series documenting black African lesbians and trans men, sixty of which are the heart of the artist's first major show in the U.S., at the Brooklyn Museum. In the past eight years, more than two hundred and fifty people have gazed frankly, shyly, proudly, defiantly at Muholi's camera, including the artist herself. "I'm one of us," she told me recently. "I'm not observing from a distance. It's not just me who is here at the museum; *we* are here. My photographs portray people who are participating in making their own history."

Before she was an artist, Muholi was an activist. Now forty-two, she grew up in the Umlazi township on the east coast of South Africa. (The show's title, "Isibonelo/Evidence," nods to her first language, Zulu.) By the time she enrolled in the famed Market Photo Workshop, in Johannesburg, where she lives, she had co-founded the L.G.B.T.I.-rights organization the Forum for the Empowerment of Women (FEW). In 2009, she established the collective Inkanyiso (Zulu for "the one who brings light"), urging younger "born frees"—as the post-apartheid generation is known—to be the historians and archivists of their own lives, from reporting at "corrective rape" murder trials to photographing baptisms. Muholi was accompanied on a trip to New York, in late April, by the soft-spoken Inkanyiso photographer Thembela (Terra) Dick, twenty-six, who was documenting their visit (her shutter clicked throughout our interview). She is also portrayed, twice, in "Faces and Phases."

Muholi's epic series is a firebrand update of the black-and-white portraits of Seydou Keïta, the great self-taught studio photographer who was active in Mali in the forties and fifties, as well as a feminist spin on August Sander's lifelong effort, "Man in the Twentieth Century." Muholi said that she's "fascinated by portraits that came before me," mentioning "A True Likeness," a book of pictures of a black community in South Carolina taken by one of its members, Richard Samuel Roberts, in the twenties and thirties. While Muholi works in color for other projects—including joyful pictures of gay and lesbian weddings and a related video, also on view at the museum—she opts for black and white in her portraits, "to create a sense of timelessness—a sense that we've been here before, but we're looking at human beings who have never before had an opportunity to be seen."

—Andrea K. Scott

MUSEUMS SHORT LIST

METROPOLITAN MUSEUM
"The Roof Garden Commission: Pierre Huyghe." Opens May 12.

MUSEUM OF MODERN ART
"Yoko Ono: One Woman Show, 1960-1971." Opens May 17.

MOMA PS1
"Wael Shawky: Cabaret Crusades." Through Aug. 31.

GUGGENHEIM MUSEUM
"Monir Shahroudy Farmanfarmaian: Infinite Possibility." Through June 3.

FRICK COLLECTION
"From Sèvres to Fifth Avenue: French Porcelain at The Frick Collection." Through April 24.

NEUE GALERIE
"Gustav Klimt and Adele Bloch-Bauer: The Woman in Gold." Through Sept. 7.

NEW MUSEUM
"Surround Audience: 2015 Triennial." Through May 15.

NEW YORK BOTANICAL GARDEN
"Frida Kahlo: Art, Garden, Life." Opens May 16.

NOGUCHI MUSEUM
"Highlights from the Collection: Iconic Display." Through Sept. 13.

SCULPTURECENTER
"Magali Reus / Michael E. Smith / Erika Verzutti." Through Aug. 3.

GALLERIES SHORT LIST

UPTOWN

Seth Price
Petzel
35 E. 67th St. 212-680-9467.
Opens May 15.

Dorothea Tanning
Boesky
118 E. 64th St. 212-680-9889.
Through June 27.

CHELSEA

Ellsworth Kelly
Marks
502 and 522 W. 22nd St.;
523 W. 24th St. 212-243-0200.
Opens May 13.

Richard Serra
Zwirner
537 W. 20th St. 212-517-8677.
Through July 24.

David Shrigley
Kern
532 W. 20th St. 212-367-9663.
Through May 23.

DOWNTOWN

Richard Dupont
Williams
55 Hester St. 212-229-2757.
Opens May 15.

Alex Katz
Brown
620 Greenwich St.
212-627-5258.
Through June 13.

Pam Lins
Uffner
170 Suffolk St. 212-274-0064.
Through May 31.

MUSEUMS AND LIBRARIES

Whitney Museum

"America Is Hard to See"

The museum has opened in Renzo Piano's ingenious new building, on Gansevoort Street, and brings with it a refurbished sense of mission for the eighty-four-year-old institution, signalled by the inaugural show, of six hundred and fifty works from the permanent collection. The timing couldn't be better for a detailed and vividly embodied engagement with the question of what has been meant by "American" modern art. Through Sept. 27.

Jewish Museum

"Revolution of the Eye: Modern Art and the Birth of American Television"

By turns illuminating and exasperating, this extensive show opens with footage of Barbra Streisand in the galleries of the Philadelphia Museum of Art, amid paintings by Léger and Kupka. The curator Maurice Berger makes some persuasive claims about the influence of fine art on ambitious television of the postwar era: the credits for the surrealist "Twilight Zone," for instance, borrowed their rotating spiral from Marcel Duchamp's "Anémic Cinéma." But a more judicious assessment of art and TV's interrelationship might not place an Agnes Martin drawing next to a promotional photo of Miss U.S.A., and the rapid-fire editing of numerous clips—eleven artists' interviews condensed to less than three minutes, for example—underestimates viewers' attention spans. Through Sept. 20.

GALLERIES—UPTOWN

Elmgreen & Dragset

The Norwegian-Danish duo, best known for their Berlin memorial to gay victims of the Holocaust, have transformed this townhouse gallery into a well-appointed bedroom, suffused with mothballs and melancholy. A shelf of books by Wilde, Mann, and Philip Johnson, and antiretroviral meds on the nightstand, evoke both the mind and the body of its absent occupant, perhaps an artist or architect (note the drafting table) of a certain age, whose love affairs are traced in framed photographs of young men. Elmgreen & Dragset deploy their fiction deftly, but there's a frisson of autobiography here, as if they, too, are bracing for the betrayals and heartbreaks of aging. Through May 23. (Galerie Perrotin, 909 Madison Ave., at 73rd St. 212-812-2902.)

Simon Hantaï

The Hungarian-born abstract painter moved to Paris after the Second World War; he died there in 2008. If the art world were a just place, this ravishing showcase of his early works would open American eyes to the overlooked virtues of French postwar painting. In 1960, inspired by Pollock as much as by Matisse, Hantaï hit upon his technique of *pliage*—painting on crumpled canvases that, when stretched, resolved into celestial abstractions that collapsed distinctions between positive and negative space. The earliest pieces here are dense and earthy, but by the late sixties Hantaï was creating all-over abstractions whose passages of yellow and green commingle with white space with harmonious ease. Through June 26. (Mnuchin, 45 E. 78th St. 212-861-0020.)

William Larson

These startling black-and-white images were made electronically four decades ago, using signals transmitted by fax machines. The combinations of pictures (hands, lips, a huge housefly), words ("press," "play," "prim," "plan"), and overlapping lines of jittery static suggest concrete poetry illustrated by Robert Rauschenberg. Closer to drawing than they are to photography, Larson's experiments foreshadowed the digital-image revolution to come, and are all the more fascinating for their primitive grit. Through July 2. (Gitterman, 41 E. 57th St. 212-734-0868.)

Alexey Titarenko

Black-and-white cityscapes suggest memories in which some details are blurred and others are highlighted. (The effect is achieved through long exposures.) In the past, Titarenko has depicted crowds in his native St. Petersburg as apparitions drifting past massive stonework. His recent pictures of New York feature sidewalks full of solitary figures, but the mood is less oppressive and the surfaces have a silvery sheen. The images are often sparked with gold toning: windows glow as if reflecting setting suns, and an antique fire-alarm box takes on the aura of a museum piece. Through May 16. (Nailya Alexander, 41 E. 57th St. 212-315-2211.)

GALLERIES—CHELSEA

Christopher Wool

How hard can it be to make inky messes and random tangles? Gruellingly so, for Wool, to a point where degrees of difficulty create meaning. This show picks up where the artist's Guggenheim retrospective, in 2013, left off, with paintings derived from Rorschach patterns and sculptures based on snarls of fencing wire that he found outdoors in Marfa, Texas. (There are also delicately scrawled etchings.) In black enamel and layered silkscreen, the paintings are desultory palimpsests of exacting decisions. For the sculptures, Wool made 3-D prints of the wire, blown up to plumbing-pipe thickness, and then cast them in bronze. (The weight-bearing parts are in copper-plated stainless steel.) The more arbitrary the look of Wool's art becomes, the more it dramatizes his ferocious will to make it. Through June 20. (Luhring Augustine, 531 W. 24th St. 212-206-9100.)

Lisa Yuskavage

She's back and she's even better, without ceasing to be bad in a good way. Yuskavage's fantasies of preposterously voluptuous, sad girls—now plus the odd tender lad—are astonishingly well painted. The colors range from sumptuous grisaille to singing prismatic hues. The touch is consummately deft. The combination of gross imagery and serene mastery is Yuskavage's cynosure—an up-to-date proposition of painting's debased fate and unkillable hope like nothing else. Through June 13. (Zwirner, 533 W. 19th St. 212-727-2070.)

"The Light in Cuban Eyes"

This survey of contemporary Cuban photography is timely, but, while nearly all the pictures were made this century, little of it looks new or inventive. Perhaps that's why the most satisfying works are black and white and rooted in the documentary tradition. Arien Chang, José Julián Martí, Jorge Louis Álvarez Pupo, and Pedro Abascal view their countrymen with the sort of penetrating concern that gets below the surface of everyday events, from a cock fight to a game of dominos; in his portraits of gay men, Alejandro González gives the revolution's outcasts a powerful presence. Through May 23. (Mann, 525 W. 26th St. 212-989-7600.)

GALLERIES—DOWNTOWN

Martin Beck

The rigorously composed photographs of this Austrian-born New Yorker depict full or empty vases, sometimes with a hand arranging flowers, sometimes with a full bouquet and a few dropped petals. Each is an updated vanitas for the digital age; they don't express the inevitability of death but, rather, the recession of life into images that are themselves only data. Elsewhere, a computer monitor flashes snippets of corporate-speak cribbed from a nineteen-seventies business manual. Like the minimalist and conceptual-art strategies of that era, the managerial cant Beck redeploys has become our new vernacular, for better or worse. Through May 17. (47 Canal, 291 Grand St. 646-415-7712.)

Jamian Juliano-Villani

If the Hudson River School dabbled with graffiti and airbrushes—and had an interest in sci-fi and comics—the results might resemble the three kick-ass paintings in this young New Jersey native's show. (Her canvasses are so big and the gallery is so small that you may want to survey it first from the sidewalk.) Juliano-Villani has a daredevil's color sense and a wild imagination reinforced by a grab bag of references, in which George Ault bumps into Ralph Bakshi. Through May 17. (JTT, 170A Suffolk St. 212-574-8152.)

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OPERA

Amore Opera

This company takes a community-theatre approach to presenting opera—it doesn't pay its singers—but what it lacks in budget it makes up for in originality. It presents Mozart's magnificent **"Don Giovanni"** in the Prague version, which cuts some brilliant music (most notably, Elvira's "Mi tradì") in favor of a shorter, faster-paced account of the impenitent lothario's story. (Connelly Theatre, 220 E. 4th St. 888-811-4111. May 14-16 at 7:30 and May 17 at 2:30.)

ORCHESTRAS AND CHORUSES

Philadelphia Orchestra

The fabulous Philadelphians, under the direction of Yannick Nézet-Séguin, have been celebrating their history of notable premières. Their final Carnegie Hall program of the season will include Rachmaninov's propulsive, elusive Third Symphony, which Leopold Stokowski unveiled in 1936. Also on the bill are Nico Muhly's newly composed "Mixed Messages," a glittering and bustling overture with explosive brass writing at the close, and Beethoven's Third Piano Concerto, with Emanuel Ax as the soloist. (212-247-7800. May 14 at 8.)

The Met Orchestra

In the first of four Carnegie Hall appearances this month, James Levine leads America's finest pit orchestra in Brahms's grandly symphonic First Piano Concerto and Berlioz's "Symphonie Fantastique." Yefim Bronfman, the soloist in the Brahms, has an unrivalled ability to combine power and delicacy. (212-247-7800. May 17 at 3.)

RECITALS

Queens New Music Festival

The lineup for this festival, now in its fourth year, includes the Lost Dog New Music Ensemble, playing works by the ex-Alaskan master John Luther Adams (including his "Four Thousand Holes," a very oblique Beatles tribute); a collaboration between Random Access Music and Iktus Percussion, featuring premières by Stephen Cabell, Gilbert Galindo, Wang Jie, and Frances White; and the group Percussia, in a program entitled "Twang and Bang: Music for Harps and Lots of Percussion." (Secret Theatre, 4402 23rd St., Long Island City. queensnewmusicfestival.org. May 14-15 at 8; May 16 at 3, 5, and 8; and May 17 at 3 and 5.)

Lang Lang

In a recital celebrating the hundredth anniversary of the Metropolitan Museum's Asian Art department, China's flamboyant piano superstar mixes Chopin (two scherzos) and Tchaikovsky ("The Seasons") with work by twentieth-century Chinese composers who blended Western and Chinese idioms—Wu Zuqiang, Du Mingxin, and Lü Wencheng. (Fifth Ave. at 82nd St. 212-570-3949. May 14 at 8.)

Stephanie Blythe and Warren Jones

The magnetic American mezzo-soprano lavishes a voice of matchless depth upon a program of urbane parlor songs from Poulenc ("Poèmes de Ronsard"), Britten ("Cabaret Songs"), Brel, Ferré, and the master of sophisticated drollery, Noël Coward (including his classic "Mad About the Boy"). Jones, Blythe's frequent and incisive collaborator, joins her at the piano. (Carnegie Hall. 212-247-7800. May 15 at 8.)

Evgeny Kissin

The commanding Russian-American pianist pairs Beethoven's extroverted "Waldstein" Sonata and Prokofiev's introverted, brooding Fourth Sonata. This pensive tone continues into the second half, with a selection of Chopin nocturnes and haunting mazurkas, mostly from the composer's early years. (Carnegie Hall. 212-247-7800. May 16 at 8.)

International Contemporary Ensemble

The new-music virtuosos of I.C.E. play back-to-back shows in Brooklyn. First, in a free event at Jack, they present works by Pauline Oliveros, one of the blazing originals of American music. The program draws on Oliveros's catalogue of text-based pieces, which challenge performers to respond intuitively and attentively to sometimes enigmatic instructions. Then, at Roulette, I.C.E. joins the JACK Quartet in celebrating "Subject," a new CD by the ruggedly expressive New York composer Jason Eckardt. (Oliveros: Jack, 505½ Waverly Ave. May 18 at 8. Eckardt: Roulette, 509 Atlantic Ave. May 19 at 8.)

MOVIES

NOW PLAYING

The Age of Adaline

It takes a long exposition to set up this romantic fantasy, but when the plot kicks in it unleashes a rush of melodramatic energy. Blake Lively plays Adaline Bowman, a woman born in San Francisco in 1908, who, in 1937, barely survives a car accident and a lightning strike that, together, leave her unable to age. A widowed mother, Adaline is eventually taken for her daughter's sister, and, to avoid raising suspicions, she changes her identity, her profession, her place of residence, and her story. In 2013, she's named Jennifer Larson and is back in San Francisco, where she works at the city archives, keeping to herself in order to protect her strange secret. Then, on New Year's Eve, the eternal twenty-nine-year-old meets a handsome young tech tycoon, Ellis Jones (Michiel Huisman); falling in love with him, she lets her guard down, with dramatic results. The conceit endows Lively's regal air of distracted superiority with an intermittent pathos, but the director, Lee Toland Krieger, brings no identifiable perspective, and the screenwriters, J. Mills Goodloe and Salvador Paskowitz, hardly tap a century's worth of material.—*Richard Brody* (In wide release.)

Avengers: Age of Ultron

Joss Whedon, who directed "The Avengers," returns with a no less bludgeoning sequel, dragging in the same gang of heroes as before: Iron Man (Robert Downey, Jr.), the Hulk (Mark Ruffalo), Captain America (Chris Evans), Black Widow (Scarlett Johansson), Hawkeye (Jeremy Renner), and the unflappable Thor (Chris Hemsworth). We find them mooching around, waiting for a wrong to put right, and, not unlike the audience at whom the film is aimed, squabbling pointlessly among themselves. A diversion arrives in the shape—or at least the digital force field—of Ultron (James Spader), who appears to be good right up to the moment when he decides to be evil. Not to be outdone, Jarvis (Paul Bettany), who has hitherto served as a computerized valet to Iron Man, acquires a humanoid form the color of ketchup—a close match for Scarlet Witch (Elizabeth Olsen), another newcomer to this already crowded scene. From start to finish, the film follows a steady pattern: outrageous mayhem, stitched with light one-liners. For Marvel, who surprised everybody with last year's "Guardians of the Galaxy," which was oddly touching and given to self-mockery, this feels like a backward step: a pure commercial product that just happens to be a movie.—*Anthony Lane* (Reviewed in our issue of 5/4/15.)

Bed of Roses

The director Gregory La Cava, Hollywood's master blender of drama and comedy, pushed the limits of acceptable taste in this 1933 tale of a stylish and fast-talking young prostitute named Lorry (Constance Bennett) and her sidekick, Minnie (Pert Kelton). Released together from a Midwestern prison, the two women board a riverboat for New Orleans without sufficient fare. Aided by moonshine (Prohibition was still in effect), they try to roll two businessmen. Lorry, justly accused of theft, jumps overboard and hops a barge to the city, where she gets a prominent publisher (John Halliday) to make her his kept woman—but she can't get the barge captain (Joel McCrea) out of her system. La Cava, working with a story by Wanda Tuchock, keeps the action darting briskly through a wide range of social settings, from palatial penthouses to dusty attics—but the light-toned swings in fortune pivot on the dark secret of Lorry's past. Like a novelist, La Cava deftly unfolds, as if in a single breath, a sardonic panorama of American hustle.—*R.B.* (MOMA; May 13-15.)

Clouds of Sils Maria

Years ago, the actress Maria Enders (Juliette Binoche), in one of her early triumphs, took the role of a dangerous young woman, Sigrid, with whom an older character named Helena becomes infatuated. Now she is asked to revisit the play on the London stage, this time as Helena, starring opposite Jo-Ann Ellis (Chloë Grace Moretz), who is widely, if unfairly, known as a Hollywood hell-raiser. Just to complicate matters, the playwright has recently died, and Maria, accompanied by her long-suffering assistant, Valentine (Kristen Stewart), goes to live in his house, in the Swiss mountains; they take hikes together and rehearse the

lines—so often, and with such intensity, that we can't always tell where their conversations end and the fragments of the play begin. If all this sounds self-involved, it is, and there are times when Olivier Assayas's new film, wreathed with ruminations on what it means to act, and on the ties that bind acting to the rest of our lives, dangles close to preciousness. Yet Assayas summons an air of unmistakable mystery, leaving much unexplained and mixing intimate encounters with bright, screen-filling vistas; you feel, by the end, that the film has earned its right to high altitude. Another surprise: Stewart, against the odds, shares center stage, and it is her character, rather than Binoche's, whose fate concerns us most.—*A.L.* (4/20/15) (In limited release.)

The D Train

In this queasy, schematic, wanly sentimental comedy, Jack Black stars as Dan Landsman, a Pittsburgh family man and an associate at a small local consulting firm, who has trouble making friends because he tries too hard. A backslapper who peppers his talk with "dude" and "bro," he's on the committee for his twenty-year high-school reunion. Discovering that the hippest classmate, Oliver Lawless (James Marsden), is now an actor in Los Angeles, Dan finagles a phony business trip to visit him and persuade him to attend. Once there, Dan falls in with Oliver's drug-fuelled night life, and ends up in bed with him. The writers and directors, Andrew Mogel and Jarrad Paul, define Dan and the other characters with nothing but their mannerisms. They see Dan's crisis as one of fidelity, not one of desire or identity, yet their easygoing way with sexual behavior is a lesson that comes off as the whole point of the flimsy, overwrought tale. Nonetheless, Black and Marsden, along with Kathryn Hahn, as Dan's wife, and Jeffrey Tambor, as Dan's boss, sell the story with nuance and verve.—*R.B.* (In limited release.)

Far from the Madding Crowd

From "The Celebration" (1998) to "The Hunt" (2012), the Danish director Thomas Vinterberg has dwelt on social fractiousness—on the ways in which bonds of trust can be forged and snapped. That interest has brought him to Thomas Hardy, whose novel hails from 1874. Carey Mulligan plays Bathsheba Everdene, who has a farm of her own and three competing admirers: her fellow-landowner, Boldwood (Michael Sheen); the shepherd Gabriel Oak (Matthias Schoenaerts); and the fickle Sergeant Troy (Tom Sturridge), who finally wins her hand, having done nothing to deserve it. The film may shrink the book, as Vinterberg and his screenwriter, David Nicholls, hurry us through the scenes (and the scenery), yet the result is far from a travesty, and this new adaptation draws nearer than does Schlesinger's version of 1967 to Hardy's sense of doubleness—to his heroine's modern zeal, amid a changeless pastoral, and to the ease with which people can dwindle from masters of circumstance to slaves of fate. Sturridge is the one weak link in a resilient cast, while Mulligan is made of darker, less flirtatious stuff than Julie Christie, her predecessor in the role. A special commendation must also go to the sheep.—*A.L.* (5/4/15) (In wide release.)

Forbidden Films

Approximately forty films made in Germany during the Nazi era remain banned there to this day. They're the subject of this documentary by Felix Moeller, which shows a revealing collection of clips from the works in question. Bans are still enforced on such movies as an anti-French historical spectacle about the Napoleonic Wars, an anti-Russian film, a pro-euthanasia movie, and a drama about the ostensible persecution of ethnic Germans in Poland. There's also, of course, a large dose of anti-Semitic propaganda; Moeller shows clips from these films, too, which are at the center of his inquiry. He talks with German historians and programmers as well as lay viewers—in Germany, France, and Israel—who have seen some of these films, and he elicits a wide range of responses regarding the ongoing censorship. The most remarkable of the documentary's participants are neo-Nazis, whose faces aren't shown and who appear silhouetted in a dark room. They and their cohorts obtain these movies easily and use them as part of their training and indoctrination, not least because the ongoing ban only increases their appeal among youths in self-styled revolt. Moeller gives opponents of censorship the last word; meanwhile, his selection of clips of the censored films offers surprising glimpses of the cinematic unconscious at work.—*R.B.* (Film Forum.)

In the Name of My Daughter

The true story of a late-seventies murder case, which is well-known in France, is a ready-made classic melodrama. Catherine Deneuve is calmly ferocious as Renée Le Roux, the elegant widow of a casino owner in Nice who is struggling to keep the business afloat in the face of predatory competition from a mobster (Jean Corso). Her lonely and socially awkward daughter, Agnès (Adèle Haenel), returns home to ask for her inheritance, which is tied up in the casino. There, Agnès gets involved with Maurice Agnelet (Guillaume Canet), an ambitious but unappreciated—and married—local attorney who is her mother's right-hand man. When Maurice's drive for power puts him at odds with Renée, he influences Agnès to help him work some behind-the-scenes mischief—and to get hold of her money. When Agnès disappears, Maurice is accused of murder. The director, André Téchiné, has a keen eye for the Balzacian furies behind the cold formalities of business and the stifling mores of the provincial bourgeoisie. The movie's French title, "The Man They Loved Too Much," suggests its true focus: Maurice, the Machiavellian outcast who pulls the strings. The story's tension slackens when the action extends to later years, but by that time a dramatic feast has already been served.—*R.B.* (In limited release.)

Iris

This portrait of the nonagenarian fashion icon Iris Apfel is one of the last films by the director Albert Maysles, who died in March, at the age of eighty-nine, and he portrays her energetic and inventive activity as a mirror of his own. Apfel, a collector and a mix-and-matcher at an exalted level of visionary effervescence, is herself a sort of documentarian: she travels widely and searches curiously, intently, and creatively, from high-fashion houses and African boutiques in Harlem to dollar sales and flea markets, zeroing in on a teeming range of items and letting her emotional impulses, her instinct for beauty, and her feel for unexpected combinations take over and create order. Apfel's travel planning resembles producing, her gathering is like filming, and her juxtapositions are akin to editing. The warm relationship between Apfel and Maysles comes through from the start, as she playfully shows off some of her treasures and addresses him on-camera throughout. Maysles endearingly reveals Apfel's blend of blind passion and keen practicality, her unflagging enthusiasm for



OPENING

FORBIDDEN FILMS
Reviewed in Now Playing. Opening May 13. (Film Forum.)

GOOD KILL
Reviewed this week in The Current Cinema. Opening May 15. (In limited release.)

IN THE NAME OF MY DAUGHTER
Reviewed in Now Playing. Opening May 15. (In limited release.)

L FOR LEISURE
Reviewed in Now Playing. Opening May 15. (In limited release.)

MAD MAX: FURY ROAD
A postapocalyptic thriller, starring Tom Hardy and Charlize Theron as desperate travellers who must cross the desert to reach safe ground. Directed by George Miller. Opening May 15. (In wide release.)

PITCH PERFECT 2
A musical sequel, starring Anna Kendrick, Rebel Wilson, Brittany Snow, and Ester Dean, as members of a competitive collegiate a-cappella group. Directed by and co-starring Elizabeth Banks. Opening May 15. (In wide release.)

SLOW WEST
Reviewed this week in The Current Cinema. Opening May 15. (In limited release.)

TWO SHOTS FIRED
Martín Rejtman directed this absurdist drama, about strange events following a teen-ager's suicide attempt. In Spanish. Opening May 13. (Film Society of Lincoln Center.)

REVIVALS AND FESTIVALS

Titles in bold are reviewed.

ANTHOLOGY FILM ARCHIVES
"'Written' by Philip Yordan." May 16 at 4:45 and May 19 at 7: "Johnny Guitar" (1954, Nicholas Ray). • May 16 at 7:15: "The Big Combo" (1955, Joseph H. Lewis). • May 19 at 9:15: **"Studs Lonigan."**

BAM CINÉMATEK
"3D in the 21st Century." May 13 at 5 and 8:



MOVIE OF THE WEEK
A video discussion of Floyd Mutrux's "Aloha, Bobby and Rose," from 1975, in our digital edition and online.



Brittany Snow, Rebel Wilson, Anna Kendrick, and company sing out in "Pitch Perfect 2," directed by Elizabeth Banks.

transmitting her knowledge to young people, and her synoptic view of fashion as living history. He also captures the jovial dynamic and mounting worries of her sixty-plus years of marriage to Carl Apfel, now a centenarian. Her sharp, unfiltered aphorisms make the movie a glittering trove of wisdom.—*R.B.* (In limited release.)

L for Leisure

The directors Lev Kalman and Whit Horn turn the bleary languor of graduate students slacking off into a substantial but meandering spectacle. They set a loosely strung series of dramatic sketches during the holidays of the 1992-93 academic year, from Rosh Hashanah and Christmas to Presidents' Day and spring break, and film them with grainy, painterly 16-mm. film to suggest independent movies of the era. There's money floating around: these young academics enjoy employment in the sumptuous setting of the fictitious Laguna Beach University, and they spend their vacations in a variety of family houses, including a Texas mini-mansion and a Great Neck spread, as well as at Sugarbush, for skiing, and in Aix-en-Provence, for romance. The archly intellectual dialogue and cushy milieu are reminiscent of the world of Whit Stillman, but, here, "L" is also for landscape: unlike the sociological hedonist Stillman, Horn and Kalman pursue a chaste ecstasy of natural wonders, investing their glorious settings with spiritual dimensions rooted in a visual beauty that is, for them, the best thing money can buy. The retro styles of clothing, music, and cinematography with which the directors adorn the action conjure the innocence of the pre-digital age and a nostalgic craving for immediate experience.—*R.B.* (In limited release.)

The Only Son

With his first talking picture, from 1936, the Japanese director Yasujiro Ozu set the template for the films that would make his name. Relying on dialogue to sustain the drama, he conjures vast emotion through poised images of an exquisite subtlety. Here, a poor widow in a provincial town toils in a silk factory to put her son, Ryosuke, a bright student, through school, so that he can become "a great man." But when he moves to Tokyo to seek his fortune, he gets sidetracked by love; marrying young and starting a family, he does unrewarding work as a night-school teacher and barely makes ends meet. When Ryosuke's mother arrives unexpectedly for a visit, after years of separation, she stifles her dismay at his calm acceptance of his narrow vistas—and he, in turn, stifles his shame. Ozu distills a lifetime of silent misunderstandings and muffled frustrations in a painful succession of false smiles and showy courtesies; with wicked irony, he illustrates the generation gap in a scene where Ryosuke takes his mother to see her first talkie—which, true to Japanese politics of the time, is in German. Ozu watches with his own stifled fury, as modernity uproots both the best and the worst aspects of tradition.—*R.B.* (MOMA; May 13.)

Saint Laurent

Bertrand Bonello's bio-pic of the designer in his prime (played by Gaspard Ulliel) keeps to a punctuated chronology, following Yves Saint Laurent from the mid-sixties through to the creation of his landmark 1976 collection, by way of occasional flashbacks, as well as leaps ahead to his time as an aged retiree (played by Helmut Berger). In Bonello's view, the sensuality of Saint Laurent's relation to fabric and form is inseparable from his sexual ardor. Here, the designer incarnates France's great two national mythologies, aesthetic taste and sexual liberation, to which Bonello adds a third, the transmission of culture, emphasizing the enduring enrichment of Saint Laurent's artistry by his childhood experiences in Algeria. The movie's best moments have a shivery eroticism and a trancelike intensity. Saint Laurent's willingness to risk degradation and self-destruction in the quest for beauty is Bonello's own overarching romantic mythology. His direction catches it only intermittently, especially in scenes with Saint Laurent's decadent lover, Jacques de Bascher (Louis Garrel), but the high-wire negotiations of Saint Laurent's partner in business and life, Pierre Bergé (Jérémie Renier), and the meticulous craftsmanship of the behind-the-scenes team, are often more cinematic.—*R.B.* (In limited release.)

ILLUSTRATION BY FRANK STOCKTON



AMONG THE 389 CANDIDATES TAKING THE 1893 BRITISH ARMY OFFICERS ENTRANCE EXAM, ONE YOUNG UNDERACHIEVER WAS SITTING THE TEST FOR THE THIRD TIME. HIS NAME WAS WINSTON CHURCHILL.

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Penfolds







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Clockwise from top: Penfolds Grange in the Magill Estate Cellar; a bottle of 1952 Penfolds Grange, which can fetch between $30-$50K at auction; a Penfolds Wines Limited Plaque posted outside the Magill Estate Winery in South Australia; Shiraz grapes being crushed at Magill Estate Winery.

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WINE BY THE NUMBERS

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Explore the full family of offerings in the Penfolds catalogue and explore the history of a great Australian winemaker one sip at a time. To learn more, visit PENFOLDS.COM.

Samurai Rebellion
Set in the early eighteenth century, Masaki Kobayashi's stately yet subversive epic from 1967 dramatizes one warrior's personal revolution with black-and-white images that establish and then smash a courtly geometry. Toshiro Mifune spends the first half of the film in a state of impacted emotion, as a samurai whose unswerving feudal loyalty has trapped him in a loveless marriage for twenty years. No one could seethe better than Mifune, but what gives the movie equal shares of exhilaration and heartbreak is the feeling that pours out of him when his son finds happiness in his own marriage, to their lord's out-of-favor mistress—and Mifune refuses to return her when the lord wants her back. Yoko Tsukasa, as Mifune's daughter-in-law, conjures an extraordinary mix of suppleness and spine, and Kobayashi's favorite star, Tatsuya Nakadai, brings surprisingly plangent, potent sentiments to the pivotal role of Mifune's best friend; in just a few scenes, he manages to embody all the contradictions of his era. In Japanese.—*Michael Sragow* (Museum of the Moving Image; May 15.)

Studs Lonigan
Irving Lerner directed this small-scale version of James T. Farrell's novel, set among the Chicago Irish in the twenties; clearly, Lerner didn't have the resources to do Farrell's characters and milieu justice, but it's an honorable low-budget effort by a group of people trying to break the Hollywood molds, and there are a few passages of daring editing that indicate what the film was aiming for. It's an underfinanced American attempt at "I Vitelloni." Christopher Knight was miscast as Studs, and even at the time of the film's release, in 1960, audience interest centered on his teen-age pals—Frank Gorshin as Kenny, and the very young Jack Nicholson as Weary Reilly, who is arrested for rape.—*Pauline Kael* (Anthology Film Archives; May 19.)

The Water Diviner
Russell Crowe makes his directing début with a film set largely in the wake of the First World War. He also plays the hero, an Australian farmer named Joshua Connor, whose three sons were killed during the Gallipoli campaign, which began in 1915. Once the conflict has ended, he travels to the Turkish peninsula in search of their bodies, so that they can be decently interred, only to learn that one son may have survived. Whenever the movie attends to Connor's quest, it is sombre and efficient, showing some of the dark decorum that upheld Bertrand Tavernier's "Life and Nothing But" (1989), in which a French officer, during the same period, sought to reckon up the dead. But Crowe's film leans unhelpfully on a shy romance between Connor and the widow (Olga Kurylenko) who offers him lodgings in Istanbul; there is a more robust subplot, which finds him caught up in the nationalist struggle, in the company of a former Turkish commander (Yilmaz Erdogan), yet even that feels like a swerve away from the movie's guiding purpose. The photography—muted, exact, and rightly unsensational—is by Andrew Lesnie, who also shot the "Lord of the Rings" trilogy, and who died on April 27.—*A.L.* (In limited release.)

Welcome to Me
Flashes of strange genius illuminate the life lessons and pat sentimentality of this antic but earnest disease-of-the-week comic drama. Kristen Wiig flings herself vigorously into the role of Alice Klieg, a near-shut-in with an addiction to TV talk shows and infomercials who suffers from borderline personality disorder but refuses to take her meds. When Alice wins eighty-six million dollars in the lottery, she fulfills a longtime dream and spends big at a low-end video studio in order to become the star of her own talk show, "Welcome to Me." There, Alice delivers monologues and stages skits, ingenuously oversharing—live—about a lifetime of intimate humiliations and unhealed wounds. Somehow, she attracts a cult following, but her self-investigation leads to self-absorption, and that's when the movie turns homiletic. But along the way, Wiig channels the regressive earnestness of the young Jerry Lewis (albeit without his physical aplomb)—there's even a telethon scene. The director Shira Piven's visual imagination doesn't match the unhinged wonder or degrading depths of Wiig's most extravagant displays; comic and dramatic touches alike strike sensitive spots but don't probe them deeply. Nonetheless, the movie's idiosyncratic delights pack a wild metaphorical punch. With Joan Cusack, as Alice's producer and on-air foil; Tim Robbins, as her beleaguered therapist; and Wes Bentley, as the slick pitchman she adores.—*R.B.* (In limited release.)

"Hugo" (2011, Martin Scorsese). • May 16 at 2 and 7: "Jackass 3D" (2010, Jeff Tremaine).

FILM FORUM
In revival. May 13-14 at 12:30, 3, 5:35, and 8 and May 17 at 1:40: "Pather Panchali" (1955, Satyajit Ray). • May 15-16 and May 18-21 at 12:30, 2:40, 4:50, 7, and 9:20 and May 17 at 4:10 and 8:30: "Aparajito" (1956, Ray). • May 17 at 6:20: "The World of Apu" (1959, Ray).

IFC CENTER
"Celluloid Dreams." May 18 at 8: "The Comfort of Strangers" (1990, Paul Schrader).

MUSEUM OF MODERN ART
"Acteurism: Joel McCrea." May 13-15 at 1:30: **"Bed of Roses."** • "Early Japanese Talkies." May 13 at 4: **"The Only Son."** • May 13 at 7: "Home Town" (1930, Kenji Mizoguchi). • May 17 at 2: "Wife Be Like a Rose" (1935, Mikio Naruse).

MUSEUM OF THE MOVING IMAGE
The films of Masaki Kobayashi and Tatsuya Nakadai. May 15 at 7: **"Samurai Rebellion."** • May 16 at 1: "The Human Condition Part I: No Greater Love" (1959). • May 16 at 6: "The Human Condition Part II: Road to Eternity" (1959). • May 17 at 1: "The Human Condition Part III: A Soldier's Prayer" (1961).

DANCE

New York City Ballet
The company presents Peter Martins's staging of August Bournonville's "La Sylphide"—a nineteenth-century tale of misguided love, enchantment, and death, set in the Scottish backcountry. Martins kept the choreography from the 1836 ballet he danced in Denmark as a young man, but the designs, by the New York artist Susan Tammany, have an updated palette. Justin Peck's rambunctious "Rodeo: Four Dance Episodes," created last season, returns. This breathless, often funny romp for fifteen men and one woman takes its cue from Copland's score, full of sharp syncopations, crashing crescendos, and melodies that are guaranteed to stick with you. • May 13 at 7:30: "The Goldberg Variations" and "West Side Story Suite." • May 14 at 7:30: "Symphonic Dances," "Rodeo: Four Dance Episodes," and "Mercurial Manoeuvres." • May 15 at 8 and May 19 at 7:30: "Walpurgisnacht Ballet," "Sonatine," "La Valse," and "Symphony in C." • May 16 at 2 and 8 and May 17 at 3: "Bournonville Divertissements" and "La Sylphide." (David H. Koch, Lincoln Center. 212-496-0600. Through June 7.)

American Ballet Theatre
In its first season, in 1940, American Ballet Theatre performed Michel Fokine's "Les Sylphides" and Antony Tudor's "Jardin aux Lilas." Jerome Robbins followed with his blockbuster "Fancy Free," in 1944; Agnes de Mille's "Rodeo" came after that, in 1950. The company marks its seventy-fifth season with a series of mixed bills that include these and other works from the early years. The spring gala, on May 18, features more seldom seen gems, including an excerpt from Twyla Tharp's tongue-in-cheek "Push Comes to Shove," made for Baryshnikov—here, it will be danced by Herman Cornejo—and a scene from Eugene Loring's 1938 Wild West ballet, "Billy the Kid." • May 13 at 2: "Les Sylphides," "Jardin aux Lilas," and "Rodeo." • May 13 at 7:30: "Theme and Variations," "Pillar of Fire," and "Fancy Free." • May 14 at 7:30: "Les Sylphides," "Pillar of Fire," and "Rodeo." • May 15 at 7:30: "Theme and Variations," "Jardin aux Lilas," and "Fancy Free." • May 16 at 2: "Les Sylphides," "Pillar of Fire," and "Fancy Free." • May 16 at 8: "Theme and Variations," "Jardin aux Lilas," and "Rodeo." • May 18 at 6:30: Spring gala. (Metropolitan Opera House, Lincoln Center. 212-362-6000. Through July 4.)

Hubbard Street Dance Chicago
This company is devoted to contemporary ballets, many of them fashioned

in the moody post-Balanchine style associated with descendants of Jiří Kylián and William Forsythe. The oldest piece on either of the two programs at the Joyce is Kylián's "Falling Angels," from 1989, a quirkily minimalist piece for eight women clad in black leotards, set in motion by the spare percussive patterns of Steve Reich's "Drumming." "A Picture of You Falling," a solo derived from a longer work by Crystal Pite—who danced with Forsythe's Ballet Frankfurt—pairs buckling, spiralling movement with a disembodied voice encouraging the viewer to identify with the dancer. The programs also include works by the company's resident choreographer, Alejandro Cerrudo, and Nacho Duato. (175 Eighth Ave., at 19th St. 212-242-0800. May 12-17 and May 19. Through May 24.)

Gibney Dance Company
What with running her new dance center while maintaining her old one, Gina Gibney is a busy lady. It's not surprising, then, that her company will, for the first time, be dancing works by other choreographers. "Still and Still Moving," by the troupe's associate artistic director, Amy Miller, looks at how a community is more than the sum of its members. In an excerpt from Hilary Easton's 2005 work "The Short-Cut," the actor Steven Rattazzi reprises his role as a figure, modelled after the scientific-management guru Frederick Winslow Taylor, who labors to increase the dancers' efficiency and is frustrated by their humanity. (Gibney Dance: Agnes Varis Performing Arts Center, 280 Broadway. 646-837-6809. May 13-16.)

Cats Paying Dues
For the tenth anniversary of his company's founding, the adept tap dancer Andrew Nemr débuts three suites. "Ever for Love" returns to the mode of his 2005 work "All for Love," mining romance from pop songs. In "Remembrances," the dancers sing and tell stories as they tap. For "Entering the Waters," they are joined by the hammered-dulcimer player Max ZT and his mellow multicultural band, House of Waters. (Tribeca Performing Arts Center, 199 Chambers St. 212-220-1460. May 13-17.)

Gelsey Kirkland Ballet / "Don Quixote"
Kirkland's small ballet troupe is an outgrowth of her ballet academy, which teaches impeccable classical technique to kids and teen-agers. Like the classes at her school, the full-length ballets she produces are immaculately rehearsed, coached, and executed. This new "Don Quixote"—a light, festive ballet set in Seville—involves both students and professionals; the traditional staging, modelled after Alexander Gorsky's 1902 version, is by Kirkland, her husband, Michael Chernov, and members of the school's mostly Russian faculty. (The music, alas, is recorded.) The sets and costumes include items bought from City Opera after its demise. (Schimmel Center, Pace University, 3 Spruce St. 866-811-4111. May 14-16.)

Cherylyn Lavagnino Dance
Naděje means "hope" in Czech. Lavagnino's new dance by that title is about the struggle against oppression and for freedom, particularly of the Czech people throughout history, as found in the contours of Janáček's Violin Sonata, played live. A similar mix of close attention to music, narrative suggestion, and political themes can also be found in the program's three repertory pieces: "RU," "Snapshots," and "Will." (Danspace Project, St. Mark's Church In-the-Bowery, Second Ave. at 10th St. 866-811-4111. May 14-16.)

Yve Laris Cohen
Cohen's recent works, which take their titles from structural terms in sheet music ("Dal Segno," "Da Capo"), have involved much heavy lifting: of slabs of wall, of sprung dance floors. The labor is self-referential, meant to draw attention to the conventions and economics of both installation art and dance performance. "Fine," presumably, is a kind of ending. (The Kitchen, 512 W. 19th St. 212-255-5793. May 14-16.)

ABOVE & BEYOND

NewMusicBox LIVE
The online platform NewMusicBox, which was created in 1999, is a place for American composers and improvisers to share their music and their stories. On May 19 at 7, it puts on its first live event, showcasing the wide range of musicians who have been featured on the site. Merging musical performances with monologues, this event juxtaposes artists who wouldn't normally share a bill. The participants are the historian, saxophonist, and sound-collage artist Matana Roberts, who explores black history and personal narrative; the composer, singer-songwriter, and musical-theatre writer Gabriel Kahane, who has drawn inspiration from Craigslist ads, Los Angeles addresses, and a Second World War-era Brooklyn commune; and the accomplished composer, conductor, and concert pianist Joan Tower, whose work has been performed by orchestras in all fifty states, as well as around the world. The pianist Ursula Oppens, long a leading champion of contemporary American piano music, and the young violinist Bella Hristova will perform during Tower's segment. (SubCulture, 45 Bleecker St. newmusicusa.org/nmblive.)

AUCTIONS AND ANTIQUES

The decision by **Christie's** to compress its Impressionist and contemporary sales into a single week—rather than the usual two—means that this will be one of the busiest five-day stretches in recent memory. On May 13, the house opens with postwar and contemporary art, in an evening sale led by a 1958 Rothko ("No. 10") in copper and sienna hues and a 1963 Warhol composition of multicolored Mona Lisas. But perhaps the most spectacular lot is Lucian Freud's "Benefits Supervisor Resting" (1994), a monumental nude depicting a woman of extremely generous proportions sprawled with Dionysian abandon across a ragged couch. A sale of Impressionist and modern art on May 14 includes works by Brancusi, Modigliani, and Degas. The highest estimates are associated with two lots, one by Piet Mondrian ("Composition No. III with Red, Yellow, and Black"), the other by Monet ("Les Meules à Giverny"). (20 Rockefeller Plaza, at 49th St. 212-636-2000.) • Following a sale filled with works by all the heavy hitters in postwar and contemporary art (May 12), **Sotheby's** holds a second, morning auction (May 13) containing a larger-than-usual cache of Calder pieces, including two whimsical tabletop mobiles in red and black, "Red Eyed Dragon" and "Le Corset Bleu." Then it's on to an auction of art from Africa, Oceania, and Latin America (May 15), dominated by Congolese ancestor statues, Fang Ngil masks, and Mayan gold. (York Ave. at 72nd St. 212-606-7000.)

READINGS AND TALKS

"NYPL Books at Noon"
The New York Public Library's weekly series in Astor Hall (the soaring space just inside the main entry), which features a writer in conversation with Jessica Strand, the library's associate director of public programs and events, continues with the photographer and memoirist Sally Mann. (Fifth Ave. at 42nd St. 917-275-6975. May 13 at noon.)

"Intelligence Squared U.S."
This series of live Oxford-style debates presents the topic "Smart Technology Is Making Us Dumb." Nicholas Carr, the author of an *Atlantic* article titled "Is Google Making Us Stupid?," and Andrew Keen, a Web entrepreneur who wrote "The Internet Is Not the Answer," will argue for the idea. Genevieve Bell, an anthropologist and a vice-president at Intel Labs, and David Weinberger, the author of "Too Big to Know," will argue against it. (Kaufman Center, 129 W. 67th St. May 13 at 6:45, with a reception starting an hour earlier. For more information, visit iq2us.org.)

Powerhouse Arena
Michael Hearst, a musician and the author of the illustrated book "Unusual Creatures," returns with "Extraordinary People," featuring fifty examples of surprising accomplishment. With his guitar in hand, he'll talk about the work; snacks, such as Nestlé Toll House cookies (invented by Ruth Wakefield, a subject in the book), will be served. (37 Main St., Brooklyn. 718-666-3049. May 16 at 2.)

Jules Feiffer
The illustrator discusses his new book, "Out of Line: The Art of Jules Feiffer," a retrospective of his career, with Martha Fay, who edited the volume. (Strand Book Store, Broadway at 12th St. 212-473-1452. May 19 at 7.)



FOOD & DRINK

TABLES FOR TWO

MOMOFUKU KO

8 Extra Place (212-203-8095)

"NOBODY LIVES THERE, and it is our guess that nobody ever *has* lived there," this magazine said, in 1952, of the perfunctorily named Extra Place, just east of the Bowery. Today, lots of people live there—the young and the moneyed, mostly, in big glass condos. David Chang's newest, grandest restaurant is at the end of the block, with twenty-three seats, which are booked weeks in advance, and a hundred-and-seventy-five-dollar tasting menu. The chefs, enclosed within a U-shaped bar, are the literal center of attention. There are seven of them, mostly dudes in black T-shirts, and they dole out uni from a wooden Japanese tray, spray atomized sherry over a coupe glass, and deliver brusque sermons on obscure ingredients like finger limes.

The evening's performance, which takes about two and a half hours for around fourteen courses, is probably good for couples who have run out of things to say to each other. Guests approach the meal with diligence. One night, a man in a springtime scarf asked how something should be eaten: a wisp of uni and a scoop of fermented chickpea paste, in a pool of bright-green olive oil. The chef who delivered the dish, and who had explained that the purée was developed in the Momofuku Food Lab, shrugged. He was probably right to suggest that it didn't matter—the dish was lovely, briny and citrusy in equal measure, and uniformly velvety—but it was hard not to feel a pang of nostalgia for waiters, who at least have to feign interest in the diner's experience.

The traditional signposts of a tasting menu were all there—bread, pasta, fish, then meat, even petit fours—but the meal was disconcerting as well as delicious, which was maybe the point. Among a parade of canapés, a conceptual take on potato chips and pimento cheese was strange and cold. Later, a bowl of scrambled eggs and caviar was irresistible almost by definition, and all the more so when piled on top of the superlative house-made sourdough. Following the haute stoner food was a new kind of bolognese, orecchiette and octopus with a lingering taste of soy. Along the back wall, a butcher's wunderkammer of splayed chicken feet and venison loin promised much, but in the end there was just one meat course, a perfect portion of glazed duck breast in XO sauce.

Chang has taught us at once how to take food more seriously and consume it more casually. The coasters are local and artisanal, but you clean up your own crumbs on the marble countertop. Everyone's too busy spooning pineapple dashi into a petri dish dotted with hydrated basil seeds to scrape your mess away, and thank goodness for that.

—Amelia Lester

Open for dinner Wednesdays through Sundays. Tasting menu $175.

ILLUSTRATION BY ANDREA KALFAS

BAR TAB SWEET AFTON

30-09 34th St., Astoria (718-777-2570)

As the Scottish bard Robert Burns must have known well ("My muse! Guid auld Scotch drink! . . . Inspire me, till I lisp an wink"), few things are more intoxicating than the pairing of poetry and a good pint. To name a pub after a two-hundred-year-old pastoral ode to serenity, then, seems like a natural move—especially if that pub, housed in a former smoke shop and owned by three Irishmen (proprietors of the Wren and the Penrose), unabashedly exalts in the riparian. "The ceiling beams are taken from the floorboards of old tugboats, and the side of the bar is from shipping crates," a bartender with a thick Cork brogue explained on a bustling Friday. Then he put down his espresso to tend to an after-work crew with a vodka-shot pep in their step. The music (Rolling Stones, Aerosmith) and cocktails (fruity numbers with names like Ruby Barlett and Saints of Liberties) are less Dublin than Astoria rustic chic. The gut-stretching fare—pillowy beer-battered fried pickles and smoked-gouda mac and cheese—seems designed to absorb stiff drinks of any provenance. Late one Saturday night, a young father whose wife was away on business fretted between a final Scotch on the rocks and relieving the babysitter. Two complimentary shots of cinnamon-and-jalapeño-infused bourbon from a sympathetic bartender solved the problem. "Even the missus wouldn't forgive you for turning this down," he said, and winked.

—Jiayang Fan



PHOTOGRAPH BY JAMES POMERANTZ



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THE TALK OF THE TOWN

COMMENT
UNCLEAR DANGERS

In the past few weeks, a certain map has been causing a lot of discussion online and, particularly, in Texas. It shows seven states in the Southwest color-coded as red and "hostile" (Texas, Utah), or blue and "permissive" (California, Colorado, Nevada), or designated "uncertain" but leaning toward hostile (New Mexico) or toward friendly (Arizona). The map also features a circle zeroing in on Texas and acronyms associated with the military. To numerous observers, its meaning is clear: it is a plan for a U.S. military takeover of Texas and beyond, or, perhaps, a rehearsal for civil war and the enforcement of martial law. Resistance is anticipated in some areas, such as the part of Southern California marked as an "insurgent pocket."

The Pentagon quickly explained that the map was actually a prop in a large-scale but routine training exercise called Jade Helm 15, scheduled to take place this summer. Blue and red are standard colors on war-game maps and unconnected to, say, voting patterns. But the theorists were unpersuaded, and the code name seemed to excite them further. (Jade—a reference to China?) Some pointed to several Walmart stores that had abruptly closed and might now, they said, be used as internment camps run by FEMA. (Walmart says it isn't so—sometimes stores just close.)

The matter might have been dismissed as another one of those things that happen on the Internet if Greg Abbott, the governor of Texas, had not sprung into action. In a Facebook post from April 28th, he wrote, "I've ordered the Texas State Guard to monitor Jade Helm 15 to safeguard Texans' constitutional rights, private property, and civil liberties." Some other Texas politicians seemed eager to show that they, too, were not the sort to take hints of martial law lightly. Last week, Senator Ted Cruz told a reporter at a Republican Party convention in South Carolina that his office had "reached out to the Pentagon," and Senator John Cornyn obtained a private briefing from a three-star general; both legislators reported being satisfied that, in this instance, at least, Texas was not in danger from the United States.



The day after Abbott posted the State Guard orders, James Comey, the director of the F.B.I., used a visit to Texas to address another set of rumors, this one concerning the supposed discovery of ISIS bases near Ciudad Juárez, which the government was said to be trying to cover up. "Nonsense," Comey said. "We do run out every tip to make sure there isn't something to it. There is nothing to it." Still, Representative Louie Gohmert wondered if states on the Jade Helm map were marked "hostile" because they were Republican or because they might "be overtaken by foreign radical Islamist elements which have been reported to be just across our border"—a grand unified theory of Jade Helm Sharia.

As it happened, real terror-related violence came to Texas last week, when two men from Phoenix, Arizona, tried to enter a school-owned building in the city of Garland, where the American Freedom Defense Initiative, an anti-Islam group, had organized a "Draw Muhammad" cartoon contest, offering a top prize of ten thousand dollars. The men were carrying assault rifles—which is legal in most cases on Texas streets—and they shot and wounded a security guard before an off-duty traffic officer working at the site shot and killed them, fending off a potential massacre. ISIS has claimed that the men were its agents. One of them, who'd had Twitter exchanges with at least one person said to be linked to ISIS, had been known to the F.B.I. (He made false statements about planning to go to Somalia and was given three years' probation.) But the extent

ILLUSTRATIONS BY TOM BACHTELL

to which there was a real operational connection is still unknown. Senator Cruz, fresh from his Jade Helm inquiry, blamed President Obama for the Garland attack, saying that he had failed to "connect the dots."

What these bewildering scenarios have in common is a perception of Texas as a battlefield in a constant war waged on all fronts. That presumption of a state of siege, fostered by politicians willing to pander to fears of mystery maps and foreign infiltration—perhaps in the White House itself—makes it harder to respond rationally, and with respect for civil liberties, when danger truly is clear and present. There are real threats, and that is what makes scaremongering so destructive. If ISIS is the answer to everything, what is the answer to ISIS?

Such indiscriminate fears have been present in the debate over sections of the Patriot Act which, if Congress doesn't act to renew them, are due to expire on June 1st. One of those provisions, Section 215, should be allowed to expire, since the National Security Agency used it—illegitimately, as the Second Circuit found last Thursday—to justify the bulk collection of the telephone records of almost all Americans. (This practice would have remained secret if not for Edward Snowden, whom Senator Cornyn has called a "traitor.") Senate Majority Leader Mitch McConnell wants to reauthorize the provisions, though it appears that libertarian-leaning members of his party will prevent that. Even Ted Cruz has expressed reservations about the use of Section 215—and don't get Rand Paul started. The middle ground is a revision of the bill, called the USA Freedom Act, which Senators Patrick Leahy and Mike Lee are trying to get passed. It, too, has flaws, but it adds protections.

There has been some realization that collecting and connecting dots when everything and anything looks like a dot is less than illuminating. The French, whose ideas about civil liberties are different from ours—with their insistence on policing schoolgirls' head scarves and comedians' jokes—seem, in the wake of the *Charlie Hebdo* attacks, to be headed in a different direction. They are debating an intelligence bill that would remove limits on domestic spying. That is where we were after 9/11, when the Patriot Act was passed and when we made mistakes. The Jade Helm training exercises are drawn on a map of the Southwest not because it's ground zero in an incipient civil war but because the landscape there is similar to that of battlefields that we have rushed and wandered into in recent years, in countries that do have "insurgent pockets." Texans should know where the real borders are.

—Amy Davidson

FREEDOM FIGHTING
EVANDER 2.0



Not long before the disappointing "fight of the century," between Floyd Mayweather, Jr., and Manny Pacquiao, the former heavyweight champion Evander Holyfield dropped by a recording studio above Jazz at Lincoln Center. "I'm not a singer," he warned, as an engineer prepared the sound equipment. He was accompanied by an energetic man named Steve Hanley, who identified himself as the C.E.O. of Team Holyfield: a kind of post-career promoter. "He's a fighter, not a singer," Hanley reiterated. Nearby stood the author and record producer (and former investment banker) Kabir Sehgal, whom Hanley called "the grand facilitator." Sehgal, who is from Atlanta, like Holyfield, had spotted the ex-champ at the airport, a few months earlier, and introduced himself: "Hey, I'm Kabir." He said that he was producing a record called "The Presidential Suite," featuring eight movements inspired by speeches that world leaders had given on the subject of freedom. The movements were strictly instrumental, but Sehgal and the composer, Ted Nash, were looking for prominent people to read excerpts of each text, as introductions. For Nehru, they'd got Deepak Chopra. J.F.K.: Joe Lieberman. Sehgal wondered if Holyfield had any interest in reading Nelson Mandela.

As it happened, the fighter and the freedom fighter had known each other well. In 1998, while accepting the Congressional Gold Medal, Mandela even announced that his greatest regret was never having become the world's best boxer. "I would like my friend Evander Holyfield to know that today I feel like the heavyweight boxing champion of the world," he added.

They met in 1990, backstage at a packed Georgia Tech stadium. It was one of Mandela's first public appearances in the United States after his release from prison. "He hugged me and asked me about Mike Tyson," Holyfield recalled. "He talked on your level." Three years later, they reconnected. "One day, I was in New York, visiting my girlfriend, and he called me," Holyfield continued. "He said, 'I'm in your home town.' I said, 'So you're in Atlanta?' He said, 'No, I'm in New York. Don't you live in New York? I'm down at Kennedy airport.' I said, 'Well, O.K., then I'm ten minutes away from you, because I'm at my girlfriend's house!' And I drove down, and we talked. It was amazing that he remembered me. He wanted me to come to South Africa." A few years after that, Mandela got his wish. In the interim, Holyfield had finally fought—and beaten—Tyson, twice. (He had also lost a portion of his right ear, to the clench of Tyson's teeth.) Coca-Cola sponsored a trip for Holyfield to Johannesburg, where the President greeted him. "SOUTH AFRICA ALL EARS FOR HOLYFIELD," one headline read.

Holyfield is now fifty-two, and retired, although he looks still to be in fighting shape. "We're really looking at Evander 2.0," Hanley said. "Right now, there's these overtones in society that refer to a concept called the struggle. But we're all about the glory, which is aspirationally looking forward, and doing the right things in the right way." Both members of Team Holyfield wore blue polo shirts with AAMCO patches sewn on the left breast. "They fix cars, and they also care enough to help fix blindness for impoverished kids around the world," Hanley said. Holyfield, too: on Friday night, in Salt Lake City, he will participate in a "fight for sight," against Mitt Romney. "You're going to

fight Mitt?" Nash, the composer, asked. "Well, we're going to mix it up a little," Holyfield said.

But first it was time to record the speech. Hanley looked over the excerpted text, which was from Mandela's Inaugural Address, in 1994, and noted a few "wacky" words, like "jacaranda" and "bushveld." After some pronunciation practice, Team Holyfield was ready. The fighter is not a singer, but his voice has a nice preacherly cast. Several takes later, Sehgal and Nash seemed satisfied.

Holyfield removed his headphones and began reminiscing about some of his more pedestrian struggles, as a young black boxer coming of age in the wake of the "Rocky" franchise. "I lived in a black neighborhood, the ghetto," he said. "The people see me running, you know what they hollered? They cussed me out. 'You ain't no Rocky! You ain't white!' So they tell me I can't do what Rocky does?"

—Ben McGrath

AT THE MUSEUMS

ART CENSUS



The Civilians, a Brooklyn-based theatre company, is nearing the end of a yearlong stint as artist-in-residence at the Metropolitan Museum. The term "residence" is only loosely applicable to the Civilians' status within the institution's walls. "We don't have an office space," Micharne Cloughley, a head writer with the company, explained the other day. "I spend a lot of time in the cafeteria."

Recently, Cloughley and her colleagues could be seen roving the galleries of the American Wing, researching the production that is to serve as the culmination of their residency: an ambitious investigation of what it means to be an American, titled "The Way They Live." The Civilians specialize in "investigative theatre"—interviewing people, then compiling a play out of their words. Curators in the department have been among their interview subjects, helping to identify a dozen works that will spark reactions. Next, Cloughley and her team expanded their investigations to include the galleries' visitors: likely interview subjects are selected on the spot, with a view to getting a broad range of ages, nationalities, and ethnicities. People listening to the Met's audio tour on headphones are left unmolested.

"Often, we are here in the morning, so then it's literally everyone," Cloughley said, as she walked through the galleries with a clipboard in her hand and a researcher, Tommy O'Malley, at her side. First target: a teen in bluejeans and a pink sweater who was hovering by the wall plaque for "Washington Crossing the Delaware." She turned out to be Birgitta Gerlach, a high-school student visiting from Portland, Oregon, and told Cloughley and O'Malley that she recognized the painting. "It's just an image you would know," she said, though she allowed that it was much larger than her history textbook had led her to believe. She did not imagine that it was an accurate representation of events—Washington's stance was "regal," but not necessarily how one would position oneself in a smallish boat on a biggish river. "It's pretty grandiose," she said of the painting. "I've never learned about the British perspective on this event. There's probably more to this than you can see."

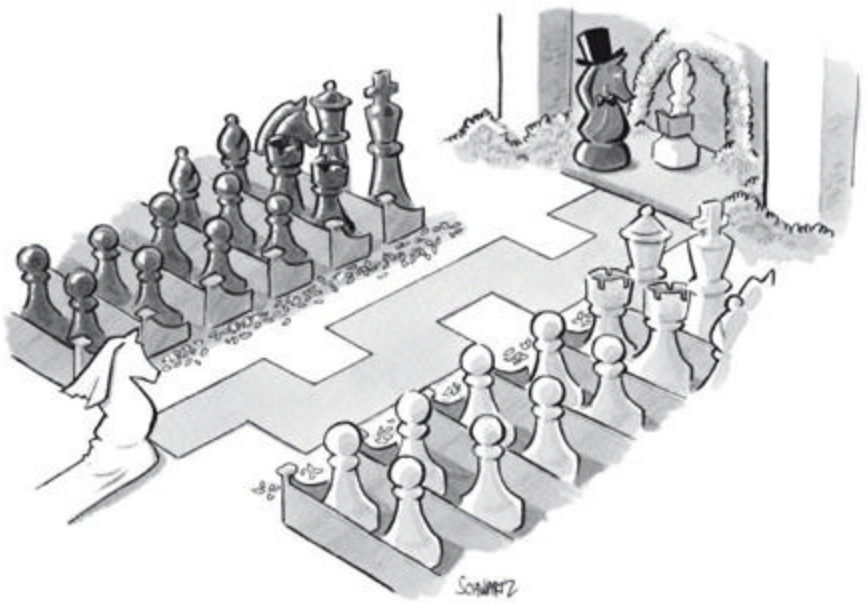
Cloughley looked delighted. "We've never had anyone say that before!" she said.

Next up: Reeta Parks, a teacher-librarian from Nashville, who was gazing wonderingly at Winslow Homer's "The Veteran in a New Field," in which a solitary Union soldier scythes a field of corn. Parks explained that she had grown up in Kentucky, in an extended family of farmers. "There were men getting out there and working very hard, and making the land work for them," she said. Several of her male relatives had fought in the Second World War. "Three came back, and one of them was drastically changed," she said. "They all worked the land. That was his solace. That was his comfort." Parks's eyes grew moist. "I am getting emotional," she said.

"That is what good art does," O'Malley said, encouragingly.

In the Civil War gallery, Cloughley and O'Malley persuaded a skeptical-looking college student named Helen Bass to share her reactions to the painting that gives the Civilians' show its name, Thomas Anshutz's image of an African-American woman tending to a vegetable garden. Bass pointed to the woman's red head scarf, and the red blossoms in the background. "Red means danger, psychologically," she said. "There is a bunch of red. It could look like blood. There has to be some symbolic reason for it." Bass found the image disturbing. "I appreciate old American relics like this, but it upsets me," she said. "It's just, like, a bad part of humanity that happened once."

Last stop: "Black Jesus," a work by Bill Traylor, a self-taught artist who was born into slavery in 1853, became



a sharecropper, and started painting at the age of eighty-five. For Cloughley and O'Malley, finding a suitable interlocutor was something of a challenge. Not the older couple, who turned them down with polite smiles; not the young man charging purposefully through the gallery, studying the museum's floorplan on his iPad.

Eventually, the Civilians benignly corralled a mother and daughter from Midland, Texas, Tracy Pierce and Chelsey Smith, in another gallery, and led them to Traylor's work. "I don't know if I see *Jesus*," Pierce said, musingly. "It could be a self-portrait. Maybe he's feeling crucified." Smith said that she had recently moved to Virginia, where she works in a research lab. "It is interesting to see more diversity," she said. "I am the only person born in America in my office. It's pretty cool. You get different viewpoints. The more people you know, the more you grow." Cloughley and O'Malley nodded with approval. Their work was done for the day. Cafeteria?

—*Rebecca Mead*

THE PICTURES
GAME



Jack Black's first acting job, at thirteen, was an Atari commercial. He wore a safari hat and bugged his eyes as he talked up a jungle-crossing video game called Pitfall. Last week, he sat at Barcade, a Manhattan pub stocked with more than four dozen vintage video games, and summoned up his line: " 'Just last night, I was lost in the jungle with Pitfall Harry, surrounded by giant scorpions and man-eating crocodiles!' "

Black is now a stout and shaggy forty-five-year-old man, master of the overconfident slacker, rocker, and panda, but the chirps and burbles of Ms. Pac-Man and Galaga, their lipstick-red coin slots, call to him still. "If I wasn't an actor, I'd want to make games and toys—blowing people's minds with fun!" he said. "I'm not technically skilled, so my game would be made out of cardboard and duct tape, and be a mishmosh of my favorite ideas, like the little mouse that jumps on the trampoline in Mappy." He smiled, thinking of the mouse.

In his latest comedy, "The D Train," Black plays a married fusspot named Dan Landsman, who tries to be the hero of his Pittsburgh high school's twentieth reunion by wrangling the class's bad boy, Oliver, an actor who starred in a Banana Boat commercial. Dan grows a soul patch, flies to L.A., finds Oliver, parties with him, trades anxieties with him—and ends up in bed with him. In roping Oliver in for the reunion, he also ropes in jealousy, self-loathing, and a taste for cocaine. "I don't get surprised by scripts anymore, and this one went to some very surprising places," Black said. "It just fucks with the sex laws" in bromances. He took a bite of his burger, and his eyebrows soared imperatively: "Dude, this Barcade burger? *Awesome!*" More softly, he added, "I don't know if I quite got the Dan part right, to be honest. In the script, there's triumph at the end, and somehow in the movie he's still a douche nozzle."

At Black's own twentieth high-school reunion, in Los Angeles, he said, "I regressed and felt anxious, the way everyone does." But wasn't he the Oliver of his school? He mentioned a scene where Oliver sucks up to Dermot Mulroney, who plays himself, "and Dermot is obviously annoyed. I thought it'd be cool, in the credits, to have a scene of Dermot being in a similar situation—because we're all in the same weird bubble of insecurity, top to bottom."

Black borrowed a pocketful of quarters and began playing Q*bert. He muttered "Taste it!" whenever he levelled up and "Oh, God, why?" whenever he got squashed. Then he tackled Ghouls 'n Ghosts, his backpack bobbing and his sneakers splayed. "I loved this game so much I wrote a song about it," he said. "It goes like this." He paused to waste some protoplasm, then crooned, "Ghouls and Ghosts / Ghouls and Ghosts / Ghouls and Ghosts / I like the Ghouls the most." For reasons of his own, he pronounced Ghouls as "Goodles" and Ghosts as "Goats."

He played Punch-Out, Atari Basketball, Donkey Kong, and Lunar Lander, increasingly nimble on the joystick. "It's all bringing back some foggy déjà vus," he said. Inside the Discs of Tron cabinet, the black light lit up his checked shirt. "Dude, *this!*" he said. He commenced making his avatar leap from platform to platform, as he sought to "de-rez" his opponent by throwing disks at him. At every level-completed chime, Black snapped his fingers and did a little dance. "He's one tough cookie—you gotta get him with a ricochet," he said, manhandling the controls. "Taste it!



Jack Black

Oh, God—why? *Why*?" Regally, he entered "JA" atop the roll of honor.

At Culver City Junior High, Black was an arcade-haunting burnout. "I was having trouble with my grades and I was having trouble with some kids who wanted to kill me," he said. He ended up at a small school called Poseidon, "where there was a therapist who was also a bodybuilder, so he could defend himself in case he got attacked by a troubled youth. I was raised a Jew, and we don't have confession, so I really wanted to spill the beans to someone. I told him I felt guilty about stealing from my mom to buy coke, and I just started bawling. Man, it felt so good." His eyebrows shot up again. "I went back to him for years, but I was always chasing the dragon—it never felt as good as that first time."

If he'd stayed at Culver, where would he be today? He laughed: "Probably designing video games. There hasn't been a 'The Godfather' of video games yet, where you fall totally in love with the characters, where you laugh, cry, and care. But I could have done that."

—*Tad Friend*

THE FINANCIAL PAGE
NEW WAYS TO CRASH THE MARKET

Five years ago, on the afternoon of May 6, 2010, the Dow and the S.&P. fell more than six per cent in a matter of minutes, losing a trillion dollars in value. The "flash crash," as it came to be known, terrified investors: it was huge, it was fast, and it made absolutely no sense. Nothing happening in the real world that day, a few market jitters aside, could explain the plunge, and the market recovered almost as quickly as it had fallen. Now prosecutors claim that they've found a culprit: a London-based trader, Navinder Sarao, who may be extradited to the U.S. to face charges of market manipulation.

Sarao is hardly your idea of a devious financial mastermind. He's a thirty-six-year-old private investor who often made his trades from his bedroom, in his parents' modest suburban house. His e-mails to regulators make him sound like a crank: "I trade very large but change my mind in a second"; "For the large part it is just my INTUITION." Yet the S.E.C. and the Commodity Futures Trading Commission claim that he's made millions of dollars trading S.&P. futures by cleverly scamming the market. Sarao denies all charges, and plenty of observers are skeptical that he had anything to do with the flash crash. Whether or not the authorities can make their charges stick, the case highlights a key truth about today's market prices: on a day-to-day level, they are determined as much by computer algorithms as by human judgment.



CHRISTOPH NIEMANN

In the popular imagination, investing is about economic fundamentals. Investors scrutinize companies, weighing factors like cash flow, product lineup, and merger plans. They keep in mind general stuff like interest-rate hikes and what's happening to the dollar. But most trading these days has nothing to do with any of these things. Instead, it's all about what the market is going to do in the very short term—often a matter of milliseconds. Most of this trading takes place too fast for humans to be involved, so the decisions are left to computers. Andrei Kirilenko, a professor at M.I.T. and a lead author of the S.E.C. and C.F.T.C. report on the flash crash, told me that the computers look at the market "through a magnifying glass, quickly changing, with every tick up and every tick down." The robots base their trades partly on factors like price changes and partly on what's in the market's "order book"—a virtual log that contains all the market's buy and sell orders.

A human trader would never be able to quickly synthesize all the information in the order book, but a bot can. Unfortunately, the bots' focus on the order book creates an opportunity for a new kind of scam, known as "spoofing," which is what Sarao is accused of. In its simplest form, spoofing involves putting in a lot of fake offers to buy or sell, in the hope of creating the impression of buying or selling pressure in the market. Sarao stands accused of flooding the market with sell orders at an above-market price. (On some days, the C.F.T.C. claims, he accounted for forty per cent of the sell orders in the market.) Allegedly, he never intended to fill those orders; it was a ploy to trick robots into anticipating a fall in price. Once the robots sold, prices would fall, at which point, presumably, Sarao would buy. Then he would do it all in reverse. The mechanics sound complicated, but spoofing is simple: you create conditions that let you buy low and sell high.

Market manipulation is nothing new. But when, back in the day, legendary speculators like Jesse Livermore drove down prices with "bear raids," they typically did so by short selling actual assets, which scared others into selling. Spoofers have found that in today's market you don't even need to execute trades: you just need to convince some robots that trades might happen. Appearance begets reality.

For now, spoofing is a minority sport and rarely has a big effect on the market. But its success points to a basic problem of a market dominated by short-term robot traders: it's exceptionally vulnerable to feedback loops. High-speed firms tend to mimic one another's trading strategies, and in times of crisis this can amplify price swings. That seems to have been what happened during the flash crash: high-frequency trading didn't start the snowball rolling, but it helped turn it into an avalanche.

The problem isn't the robots per se but the uses we've put them to. As Kirilenko told me, "Automation should, in principle, make markets cheaper, faster, and more accessible." Indeed, markets today incorporate new information faster than ever before. Yet they are also fundamentally less stable, and more prone to sudden and inexplicable breakdowns. A 2014 study of the impact of algorithmic trading across forty-two global stock markets found that it made the markets more liquid and more efficient but also more volatile. Even more striking, a 2013 study of commodity markets found that, over the years, these markets have become increasingly self-reflexive: sixty to seventy per cent of price changes are driven not by new information from the real world but by "self-generated activities." Markets, in other words, are moving themselves much of the time. That may be how Navinder Sarao got rich. It's also how we've arrived at a situation where a trillion dollars can vanish in a matter of minutes, even though the real world hasn't changed at all.

—James Surowiecki

OUTSIDE IN

Nell Zink turned her back on the publishing world. It found her anyway.

BY KATHRYN SCHULZ



Bricklaying "was more valuable for my intellectual life than my entire college career."

The kookaburra in the Berlin Zoo is ten thousand miles from home, squat, top-heavy, large of beak, attractive of plumage, and making what is, ounce for ounce, the loudest, strangest sound I have ever heard emerge from a living creature. It begins with a classic evil laugh, *bwaaahahahaha*, à la Vincent Price in "Thriller," then the bird throws back its head and lets out a series of hoots, like a plump British woman with an unbecoming but infectious laugh or a parrot that grew up in a frat house, dissolves into giggles, transitions to a chortle, appears to become an entire dinner party going to pieces, then starts to pull it together, O.K., O.K., the guests wiping their eyes and settling down, until out comes a little chuckle and *hahahahoik!ha*, the bird is cracking up again.

"Oh, my God, you are truly weird," Nell Zink tells the bird. Zink, a novelist—reared in rural Virginia, expatriated these past eighteen years, acquainted with weirdness, fond of birds—steps closer to inspect it. "Look at the blue in his wings," she says: two shades, turquoise and teal. "He's so designer. He looks like an Italian bathrobe." Affronted, perhaps, the bird abruptly ceases its lunatic call. In the aftermath, the squawky room feels intensely quiet, the way even Manhattan seems silent when the car alarm across the street finally stops. After a moment, Zink resumes her conversation with the bird. "You can keep singing the song if you want," she says. "I promise not to look at you that way again." The kookaburra, unmoved, regards the wall. In the background, some other bird will not stop repeating a single grating note. "That one is ridiculed by its fellow-birds for its stupidity," Zink says.

I am in this birdhouse because Nell Zink knows a lot about birds, and because almost no one knows anything about Nell Zink. Her début novel, "The Wallcreeper," came out last year, when she was fifty. (The title refers to a mountain-dwelling bird with crimson wings.) She wrote it in three weeks, chiefly as a provocation to the novelist Jonathan Franzen, and sold it, for three hundred dollars, to a tiny publishing house, Dorothy, which focusses on books by or about women. At the time, she was trying to sell a different book, "Sailing Toward the Sunset by Avner Shats" (by Nell Zink). A friend told Zink about Dorothy and asked if her book was about women. No, she replied, the book's main female character was a seal—more precisely, a half-seal, half-woman who is romantically involved with a Mossad agent tasked with finding and killing the heir to the throne of Israel, i.e., the closest living relative of King David. Anyway, Zink figured, probably not the kind of woman Dorothy had in mind. The main character of "The Wallcreeper," though, was a woman, so she sent the press that book instead, even though she regarded it as "unpublishable trash."

In that opinion, Zink found herself, not for the first time, at odds with the world. "The Wallcreeper" possesses an unimprovable opening sentence—"I was looking at the map when Stephen swerved, hit the rock, and occasioned the miscarriage"—which doubles as an introduction to how it feels to read Zink: swerve! crash! The book's narrator, Tiffany, is the one notably not in the driver's seat. Indeed, it is doubtful whether, in a figurative sense, she has ever looked at a map in her life; she lacks a goal, a plan, an inner compass,

PHOTOGRAPH BY GARETH McCONNELL



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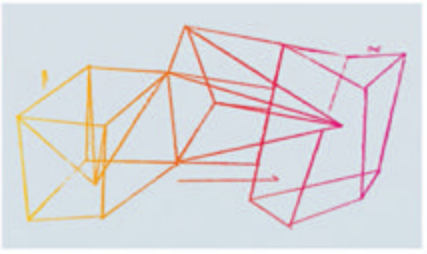
anything resembling a sense of direction. She meets Stephen in the pharmaceutical company where they work, marries him three weeks later, quits her job, and follows him as he is transferred to Switzerland and then to Germany. Stephen, it turns out, is passionate about birds. Tiffany, it turns out, is not passionate about Stephen. Together (sometimes), they wander around Europe, pursuing extramarital sex, environmental activism, and, eventually, environmental sabotage, until life falls apart and—in an end as swift and surprising as the beginning—Tiffany gets it together. A hundred and ninety pages and zero chapter breaks, the book sounds like nothing you have ever read, and derives its bang from ideas you hadn't thought to have. Critics raved, including in the *Times Book Review,* a thing that had never happened in the history of Dorothy, or in the history of Nell Zink.

Zink's new book, "Mislaid," comes out this month from Ecco, an imprint of HarperCollins. In its opening pages, the protagonist, Peggy Vaillaincourt, realizes that she is a lesbian—or, as she concludes, a man, more nuanced accounts of same-sex attraction being unavailable to preteens in small-town Virginia in the nineteen-sixties. Nonetheless, when she goes off to nearby Stillwater College as a slim androgynous girl of seventeen, Peggy begins sleeping with a gay male poetry professor, Lee Fleming. That gets her both pregnant and expelled, and before we have reached Chapter 3 the budding lesbian has become a faculty wife and a mother: to a son, Byrdie, and a daughter, Mireille.

In short, the title of this novel is a joke. Its protagonist, however, is soon mislaid in another sense as well. Lee quickly loses interest in Peggy and reverts to more familiar pastimes, and he reacts to her increasingly desperate unhappiness by threatening to institutionalize her. In response, she runs away, leaving Byrdie behind but taking Mireille, a blue-eyed, white-blond three-year-old. For a new home, she appropriates an abandoned shack in southeastern Virginia; for a new identity, she acquires, for her daughter, the birth certificate of a recently deceased four-year-old. The hitch: that late child was black. And so, presto chango, Peggy Vaillaincourt becomes Meg Brown, the single, impoverished, African-American mother of Karen Brown, a putatively black child whose patent whiteness is rivalled in American culture only by Steve Martin in "The Jerk."

"Irreverent," that prose-friendly adjective, does not come close. White writers seldom laugh about race—or, for that matter, write about it. But Zink, who has the courage of her convictions and the buffer of the Atlantic Ocean, creates in "Mislaid" a high comedy of racial identity: "The Human Stain," backward, by David Sedaris. That makes the book a rarity on at least two fronts, because the shortage of smart new novels about race has nothing on the shortage of genuinely funny literary fiction. But Zink is a comic writer par excellence, one whose particular gift is the capacity to keep a perfectly straight face. "The Supreme Court had invalidated one segregation scheme after another, no matter how well it worked": over and over, she deadpans her way through lines like that, not to mention through the entire antic setup of "Mislaid."

The result is a hoot, a lark—all those bird words. But it is also deadly smart. Zink writes about the big stuff: the travesty of American apartheid; the sexual, economic, and intellectual status of women; the ephemerality of desire and



its enduring consequences. We think of being deadpan as playing it straight during comic episodes, but Zink stays deadpan through everything—through outlandishness, anger, injustice, grief. Both that voice and the stories Zink tells are so startling, so seemingly without antecedent, that she would seem like an outsider artist, if she did not betray so much casual erudition.

Still, if not precisely an outsider artist, Zink was, for a very long time, an outsider: unknown, unpublished, living deliberately far from the mainstream and looking at it with the sharply angled vision that such a position affords. But, with the enthusiastic reception of "The Wallcreeper" and the publication of "Mislaid" by a mainstream press, Zink has migrated to the inside. At a time when American literati are debating whether writers are better served by living in New York City or getting an M.F.A., such migrations, from so remote a starting point, are far from the norm. How Zink accomplished hers, halfway through her life and from half a world away, is a story nearly as improbable as anything in "Mislaid."

"Nell Zink," Nell Zink assures me, is her real name. Her birth certificate lists her as Helen—"I guess because there was no St. Nell to baptize me after"—but she is Nell for all other official and interpersonal purposes. Zink offers up this information unprompted, but it is the case that her name, her life story, even her existence can provoke in others a sense of suspicion, a feeling that perhaps they are the subject of a colossal put-on. "Everything in her life beginning with her own name sounds made up," Franzen told me. " 'Nell Zink from Bad Belzig'!"

Zink is not exactly from Bad Belzig, though that's where she lives now. She was born in Corona, California, in 1964, moved with her family to King George County, Virginia, when she was seven, and is talking to me in Berlin, in the studio apartment, belonging to a friend, where she stays when she visits the city. The mattress she sleeps on while there is in a corner on the floor. She is sitting in a chair opposite, cross-legged, in cords and a hoodie, betraying no evidence of the fact that she is fifty-one or of the zany headlong energy of her books. In person, Zink is self-contained, deliberate, and serious. At present, she is nursing a cup of coffee and talking about artillery.

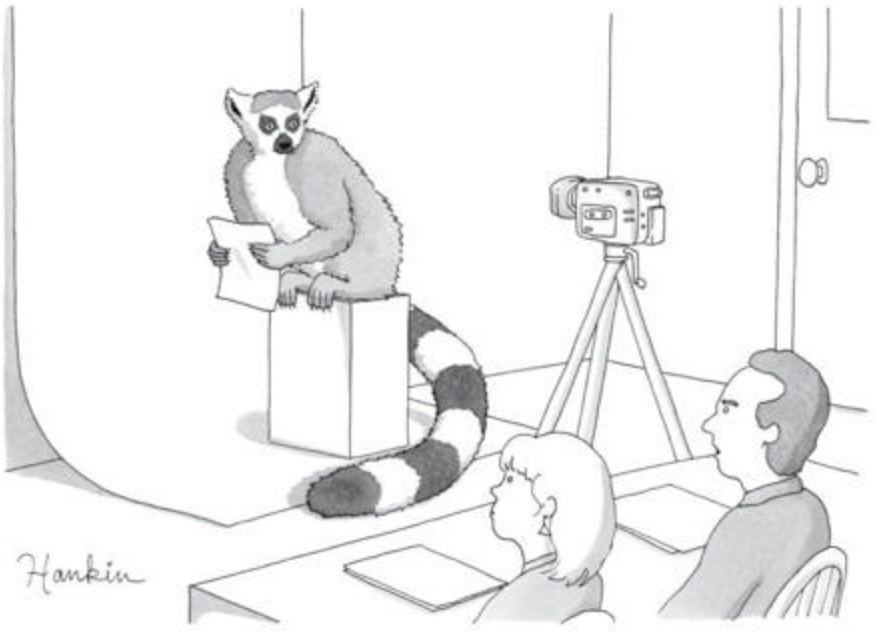
"In King George County, there's a stretch of the Potomac River that does this—curves around and then runs straight for miles," she says. The hand without the coffee cup snakes through the air to illustrate. "The Navy would test the guns for its ships there, up to eighteen-inch guns, just fire these huge

projectiles, which would then sometimes come bouncing into Colonial Beach." Sounds dangerous, I observe. Yes, she says. The river was closed to civilians during the week. Occasionally, the projectiles would bounce farther, into town.

Zink's father, who died in 2006, was a Navy engineer; it was his job that brought the family to King George County. At the time, only some eight thousand people lived there, many of them black and a disproportionate number of the rest, she recalls, members of the Ku Klux Klan. Zink's family was not among these, but she remembers the rallies, and, as a kid, she says, "it never crossed my mind that there was anything unusual about them."

Zink grew up "in the sticks," in a house surrounded by woods, with her parents and two brothers, one thirteen months older and one twenty months younger. It was not a happy childhood. In "Sailing Toward the Sunset," she writes, "My verbal skill, such as it is, originated not in a habit of speaking, but in a lifetime spent preparing a single essay . . . on the subject 'Why are you crying?' " That passage is autobiographical. "I did cry every day at school, for I don't know how many years," Zink says. Her mother, a librarian and Marine Reservist who became a housewife after marriage, pulled Zink out of class every six weeks or so, "for what she called psyche repair," and, choosing to believe that Zink simply needed to be in college, took her to Fredericksburg and let her wander around the University of Mary Washington.

Zink really was intellectually undernourished, in both the Virginia public schools and the Shenandoah Valley boarding school she attended on a merit scholarship for the end of high school. But a better education would not have resolved her unhappiness. She makes it clear that her childhood was traumatic, in ways that render the word "perpetrator" relevant and that also implicate those who failed to protect her. But she is circumspect about the details, and wary of retroactive narratives. "I think a lot of people flatter themselves that their memories are much more accurate than they are," she says, "and they forget that the perspective of a kid is so limited and unsophisticated."



"I'm sorry. We don't want a ring-tailed lemur. We want a ring-tailed-lemur type."

• •

For herself, she says, "I know for a fact that there's a moral judgment I brought to it as an adult that I was incapable of having as a child. Just like with Klan rallies: it's normal."

Zink responded to her circumstances "by pitching my tent outside the folds of humanity." She sought refuge in the wilderness surrounding her house, and in books. "We were encouraged to read," she says, "because a child who is reading is a very quiet child and does not cause any trouble while it's reading." While still young, she fell in love with "A Midsummer Night's Dream," and by the time she was eleven or twelve she had read "Hamlet," in her estimation, "a million times." Around that same age, she read "The Sacred Wood," a collection of T. S. Eliot's essays and literary criticism. When she wasn't reading, she spent a lot of time sitting alone in a boat on a pond.

Zink began writing at a young age as well, but, unlike her reading, that behavior was not met with approbation. "My mother was very, very critical of my early efforts," Zink says. "She was, like, 'At your age, the Brontës were doing X, Y, and Z.' " She gives me an "I know" look; as an adult, Zink understands how that criticism sounds. As a child, however, she had already taken her own measure and found it wanting. "I was definitely a poser as a little kid," she says. "It was just clear to me that—you know, in 'Little Women' they're reading 'The Pickwick Papers' and putting out a newspaper and being unbelievably productive, and I was not like that. So I had this feeling of inferiority to past models with or without my mother's criticisms."

Partly in response to that feeling, Zink began keeping her writing to herself. In college, at William & Mary, in Williamsburg, she avoided English classes and studied philosophy instead—a decision that she now regards as a mistake, together with the past two hundred years of the discipline. Upon graduation, she stayed in Williamsburg and became intentionally homeless. "I didn't have any money," she says, "and I figured if you can talk somebody into storing your clothes you can sleep anywhere." In her case, "anywhere" meant college lounges and the lobbies of public buildings.

Eventually, Zink found an apartment share that she could afford, partly because it was in a historically black neighborhood, and partly because, by then, she was employed. The position

in question came about by accident; she had been on her way to apply for a job as a cocktail waitress when she ran into a bricklayer acquaintance, who offered to hire her instead. For the next four years, Zink worked as a bricklayer in the Tidewater region of Virginia. "That job was more valuable for my intellectual life than my entire college career," she says. "In college, they allow you to be entertained and let your mind wander, which is not good training to do anything difficult." Bricklaying, by contrast, cultivated discipline. When she started, she was teaching herself French by reading Sartre's memoirs, "Les Mots," with a dictionary in hand. The longer she worked in construction, she found, the longer she could stick with Sartre.

Leaning forward, Zink shows me her hands: they are, like the rest of her, long, slender, and unlined. When she worked in construction, she says, she had enormous calluses—not just on the palms but on the backs as well. After four years, she got tired of the toll on her body, and, in 1989, she moved to Washington, D.C., and got a job as a secretary. ("If you are raised to be submissive," she says, "being a secretary is an excellent job. And I was an excellent secretary.") While there, she met a graduate student in library sciences, Ben Burck, who was visiting from Indianapolis. After he returned home, the two began corresponding by letter, and, upon his graduation, he came back East to visit her. Within a week, they were married. The next year, Burck was hired by the New York Public Library, the couple moved to Hoboken, and Zink began working as a secretary at Colgate-Palmolive.

That job came with a perk: office supplies. This was back in the heyday of zines, those semi-samizdat analogue blogs, and in 1993 Zink started her own, *Animal Review*, featuring music reviews by various contributors and short stories by her about animals. Meanwhile, she and Burck started a band, F.E.R.R.E.T.: Zink on guitar, which she'd learned as a kid; Burck on bass; a drum machine on drums. The zine attracted, at its peak, perhaps eighty readers. If you haven't heard of the band, you are not alone. "There was a real nineties guitar-noise thing back then, and a million bands sounded alike," Zink says. "And we sounded like all of them." That is not something that would ever be said of Zink's creative output again.

In 1995, Burck got a job at the University of Pennsylvania and the couple moved to Philadelphia, where the relationship ended as abruptly as it had begun: the afternoon they closed on a house, Zink told Burck that she was done. "Being married to an academic librarian, living in a house—that was not what she was comfortable committing her life to at that point," Burck says. (The two have not seen each other in eighteen years, but they remain in touch and on good terms.) Zink stayed in town and continued to produce *Animal Review*. In 1996, a small article about her appeared in an issue of the Philadelphia *Inquirer*, which, in turn, appeared on a bench in a bus shelter, where an Israeli poet and musicologist named Zohar Eitan, on sabbatical at Penn, sat down on it. He fished the article out from under him, read it, and wrote Zink a letter, explaining, among other things, that his favorite animal was the ladybug. Eight months later, Zink married him, moved to Israel, and got a job as a technical writer for a software company.

By 2000, that relationship had ended as well, and, at the age of thirty-six, on an invitation from an old friend, Zink moved to Germany. Once there, she sat down, examined her life, and swore off marriage. Then she took a job as a translator and fell in love, instead, with birds.



"The doctor didn't make it."

In July of 2010, Jonathan Franzen published an article in this magazine on the illegal hunting of songbirds in the Mediterranean. Six months later, he received a two-page, single-spaced, typewritten letter postmarked Reutlingen, Germany. "Dear Mr. Franzen," it began, "I recently translated Martin Schneider-Jacoby's birding guide to the wetlands of the western Balkans." The letter, which went on to describe the plight of birds in that region, was simultaneously erudite, colloquial, mocking, and sincere; it contained a reference to Pierre Bourdieu's "Les Règles de l'Art," an aside on the Balkan war, an untranslated passage in German, armed Italians, alarmed park rangers, great bustards, spotted crakes, "ditch" used as a verb, and the phrase "fucking it up." The author expressed the conviction that Franzen would do his part for the birds of the Balkans, because "you love them for what they are (tiny little displaced persons)." Very truly yours, the letter concluded, Nell Zink.

Franzen laughs when he talks about

the letter, a laugh of bemused appreciation that accompanies much of what he has to say about Zink. "It was so emphatic, so presumptuous, in a good way," he says. "There was a feisty tone to it, not quite as strong as 'You don't really know anything about birds,' but something like 'They call you a *New Yorker* reporter and you didn't even write about the Balkans?'" He wrote back to thank her, "and the next thing I knew," he says, "I was getting, like, five e-mails a day."

Five e-mails a day is a Zink specialty; since meeting her, I have routinely woken up to that many, a subject heading several lines down in my inbox serving as the ground floor to a little apartment building of postscripts, post-postscripts, corrections, emendations, and elaborations. Franzen, who is not normally in the market for pen pals, says that volume of correspondence would usually set off his crazy-person radar. But Zink's e-mails were exceptional. For one thing, her erudition was startling. "She constantly referred to things that I not only hadn't read but hadn't even heard of," he says. "If she made a list of her hundred favorite books and we compared it to mine, there might be four titles in common." I understood what he meant when Zink told me she considers Yaakov Shabtai's "Past Continuous" to be "one of the best books ever written in the history of the world." She also praised the eighteenth-century Austrian writer Adalbert Stifter. (With some exceptions, the other authors Zink most admires also hail from east of the Rhine: Dostoyevsky, Kafka, Andrei Platonov, Bruno Schulz.) Meanwhile, her own writing was equally startling. "Every e-mail was so vivid," Franzen says. "She is somebody who could make a three-hundred-word account of going to the grocery store for milk an interesting story. It was just evident that she was this naturally fantastic writer." Simultaneously alarmed by the e-mail deluge and impressed by the prose, he encouraged Zink to find a wider audience. "I said, 'Maybe you should try writing fiction,'" Franzen said. "And she said, 'Oh, I've done that.'"

In 1997, not long after Zink moved to Israel, Eitan took her to Haifa to introduce her to a friend of his, a writer named Avner Shats. By the end of the evening, Shats and Zink had launched an extraordinary friendship. The two lived some sixty miles apart and did not see each other often, but they began corresponding nearly every day. Zink also set about trying to read his first book, "Sailing Toward the Sunset," but Shats regarded that as "an impossible task": it was a difficult postmodern novel written in Hebrew, a language that Zink had barely begun learning. Either in defiance or in accord, Zink gave up trying to read it and started rewriting it in English instead.

Zink wrote "Sailing Toward the Sunset by Avner Shats" in three weeks. The novel has, Shats clarifies, "absolutely no similarities to my story"—or, for that matter, to any other story ever written. In addition to the seal-woman (a figure from Celtic mythology called a silkie) and the Mossad agent with the preposterous mission, the book features Zink herself, Eitan, and a mysterious submarine powered by a slip of paper on which is written the name of Moshe Dayan. Toward the end of the novel, that paper is transferred to and animates, with arresting results, the agent's childhood Teddy bear.

Plenty weird, and plenty plenty, but that is not the sixteenth of it. "Sailing Toward the Sunset" also contains, among other things, an inquiry into the nature of translation; a translation proper, by Zink, of Robert Walser's "The Job Application"; a lovely, controlled short story based on a diary entry by Kafka; a lot of incisive, off-the-cuff literary criticism (of Proust, Richardson, Faulkner, Eliot, Melville, Sterne, Solzhenitsyn); and a short work of science fiction, set in Long Island City, in a future where the global population has shrunk radically and those who remain in the planet's skeletal, sky-high cities are "doomed, like the great whales: so few were left, in so large a space." Avner Shats, the first and for many years the only reader of "Sailing Toward the Sunset by Avner Shats," was, he says, "overwhelmed by her ability to write such excellent stuff so fast." He liked it so much that he translated it into Hebrew.

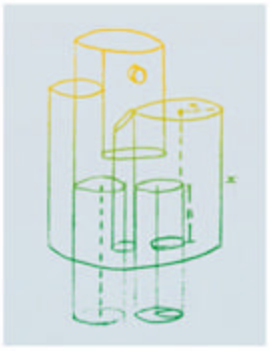
"Sailing Toward the Sunset" is representative: until last year, all of Zink's work was written for a tiny audience—generally as tiny as one or zero. While working as a bricklayer, she wrote a series of stories about a construction worker, then threw them all away. In Germany, she made friends with a Russian composer, and wrote, for his amusement only, a libretto for an operetta—in rhymed couplets, in German. In 2005, she wrote another novel for Shats, "European Story." Set at an artists' retreat in Florence, it is slightly less madcap than "Sunset," but no less funny and smart. I know that only because Shats held onto his copy; Zink deleted hers. Later, she wrote another novel, "The Baron of Orschel-Hagen," about a patron of the arts obsessed with commissioning a very particular work. Afterward, Zink decided she didn't like it, and erased the original and all the backups.

Burck, her first husband, attributes the clandestine nature and short half-life of Zink's writing to the Brontë-or-bust standard of her childhood. "The thought that she might write something that wasn't good was terrifying," he said, "so it's safer to not write or not show anybody what you write." Zink herself often speaks of writing for the love of writing, and that must be partly true, too. Certainly she was not reaping any reward, beyond the pleasure of amusing herself and maybe one other person. Still, she recognizes that directing her work to one heterosexual man who wasn't her partner was a way of protecting herself: her writing could be interpreted as flirting, rather than as writing in earnest. "It's nice to have the excuse of heteronormativity," she says. "You can explain it away, you can say, 'Well, she has a crush on him.' It lowers the risks for me."

Zink also recognizes that, although she was writing to men, she wrote in a way that men seldom do. "The standard male version of what I was doing," she says, "is to have this unbelievably endless thing you've been working on since you were seventeen. I wasn't like that at all. I was always trying to create some little thing, then finding it wanting and throwing it away." After deleting "The Baron of Orschel-Hagen," she decided to give up fiction altogether and pursue journalism, in German, on behalf of birds—a plan

that held up until, as she put it, "I was hailed on my life raft by the passing containership Franzen."

Bad Belzig is a town of some eleven thousand people, an hour southwest of Berlin. Zink's apartment there consists of one main room, high-ceilinged and full of light, a bathroom, and a small kitchen, which has no refrigerator, because Zink regards refrigeration as unnecessary. The décor is attractive but spare, and although she has lived there for two years, she has not entirely unpacked; suitcases and half-opened boxes of books lean up against one wall. We sit on a rug next to a small bookcase, because there are no couches or easy chairs. It takes me a while to realize that there is no bed, either, and to identify as such the twin futon mattress in a corner on the floor.



Zink moved to Bad Belzig from Reutlingen to be near her current romantic interest—although not too near, because she has kept the vow she made in 2000 to avoid committed relationships. She refers to her non-partner only as Mystery Boy, and declines to say much about him, except that in the summer the two enjoy lounging by lakes and paddling the local rivers. That latter activity is logistically easy, because, she says, "for political reasons, he has access to a large collection of rubber rafts." In public, he pretends not to know her.

Talking with Zink has this much in common with reading her books: you spend a lot of time feeling thrown. In part, that's because her life is weirder than many. In part, it's because both her range of reference and her computational power are immense; she has more dots, and she can connect them faster. And, in part, it's because she can be mercurial. Generally thoughtful, she has a tentative manner that can turn abruptly confrontational. At one point, she showed me a lunchbox, now full of snapshots, that she has had since kindergarten. Made in 1967, it had a "Campus Queen" theme and, on its back, a board game: "Your date is late, wait one turn"; "Earn $10 babysitting, go to the movies." Looking it over, I remarked, idly, that ten dollars per hour seemed like a lot of money for a babysitting gig in 1967. "Don't be so pathetically American," she snapped, not kidding, and delivered a short lecture on income stagnation: a bird ridiculing its fellow-bird for stupidity.

I didn't take it personally, but I did take it as telling. "Pathetic" is a decent synopsis of Zink's over-all attitude toward America. She is withering and reasoned about its socioeconomic structure ("From the perspective of Europe, America looks an awful lot like Brazil"), and withering and hyperbolic about its literary culture. She repeatedly described American readers as "quitting at page 4," and expressed surprise that the critic who had travelled to Germany to meet her had read "Mislaid" to the end. She dislikes many of the books most widely revered here, and dismisses whole swaths of the national bookshelf as "Salinger-damaged postmodern crap." ("Pynchon I've started again and again and thought, Who needs this?" she says. "The same thing with 'Infinite Jest.' I just can't stomach the adolescent wonder-child gestalt that oozes off every page.") She regards the U.S. publishing industry as shallow, profit-driven, and parochial.

Home, partner, companionship, literary culture: it is impossible, if you spend time with Zink, to miss the way she repeatedly embraces and repudiates, half-occupies and half-abandons so many parts of her life. Her mother, she wrote to me in one of her e-mails, "was a rock. But (for me) like one of those islands with no harbor, where the life raft circles around and everybody on it just gets hurt trying to disembark."

We've seen Zink on that life raft before. But, for someone so shipwrecked, she initially responded in an unexpected way when, in 2012, Franzen, her putative rescuer, once again urged her to publish her work. Most writers would have been flattered. Zink was irritated, and the more admiration he expressed the pricklier she got. As Franzen saw it, prose like hers is so rare that, sooner or later, it gets the recognition it deserves. As Zink saw it, the publishing industry operated on cronyism and commercial possibility, while she lived six thousand miles away, knew zero insiders, and wrote the kind of stories those insiders would flatly reject. Eventually, she told Franzen to stop: "I was, like, either you're going to support me in practical ways, or you're going to shut the fuck up about my talent."

The brazenness is only part of what's surprising about that statement. The other part is that, for the first time, Zink was openly seeking to publish her work. Perhaps it was because she had recently lost her harshest critic: her mother died that year, at the age of eighty-five. Perhaps it was because of so much encouragement from her most powerful fan. Most likely, it was the confluence of those events. At any rate, when Franzen told her to let him know if she ever wrote something publishable, Zink sat down and generated, in four days, the first fifty pages of "The Wallcreeper." Duly impressed, Franzen asked her to send along a complete manuscript when she had one. Too busy with a translation project to finish the new book right away, Zink sent him previous work, including "Sailing Toward the Sunset."

Franzen recognized "Sunset" as too loopy and recondite to attract a large audience. But, he said, "it was so sparkly and funny that I agreed to find a publisher for it." That proved difficult, and eventually he suggested that she write something slightly more accessible. By then, Zink herself had sent "The Wallcreeper" to Dorothy, so she sat down and drafted, again in three weeks, a new novel. She saw it, at the time, as a kind of loss leader for her other work—as, in her words, "agent bait." The agents bit. Last year, shortly after Dorothy published "The Wallcreeper," Ecco shelled out six figures for the book that became "Mislaid."

The outsider status, the unusual taste, the hint of a hoax: all the qualities that make Zink's life story so distinctive work remarkably well on the page. Her antagonism to the ideas, styles, and influences of her compatriots inoculates her against unoriginality. Her work combines, improbably, the intellectual traditions of Eastern Europe with the cultural traditions of rural Virginia. Her breakneck pace often serves her prose

well, as does her cynicism. It isn't a coincidence that "Mislaid" takes as its subject matter sexual and racial transgression, or that "The Wallcreeper" opens with a car crash and a miscarriage. That is Zink's scorn at work: she knows what makes people look. But those moves are appropriations, not capitulations, and they abet subversive and original stories.

"Mislaid" is, in its way, as scathing a critique of America as the one that Zink offers in person. What differs, radically, is the tone. Built on the model of a Shakespearean comedy, the novel is a romp of disguise and mistaken identity, with race-swapping in place of cross-dressing. Crucially, that race-swapping happens in name alone, making it the moral opposite of blackface: Meg borrows the historically pernicious authority of the state to enforce racial identity, while changing nothing about the way she and her daughter look or behave. In effect, she hijacks the most extreme form of racial essentialism (the "one-drop" rule, codified in Virginia as the Racial Integrity Act of 1924) to serve the most extreme form of social construction.

But "Mislaid" is also a comic critique of something else: horrifically reckless parenting. Having abandoned one of her children and deceived the other, Meg, needing money, turns to dealing drugs. Thus she lives with two chronic fears: that the cops will take her away from her daughter, and that her daughter will learn her history and go away on her own. Inevitably, Karen does learn that history: in fiction, siblings separated at birth (or thereabouts) are two cute little guns on the wall. But this is a comedy, not a drama, so all the characters in "Mislaid" eventually find themselves in the same room—where, as in Shakespeare, all is revealed, and all is restored.

"Mislaid" is not a perfect novel. Comedies are tragedies plus time, the saying goes, but they can also be tragedies minus consequences. The characters in "Mislaid" hurt each other and tell epic lies and commit crimes, but no one ever seems fazed, and everyone gets away with it. That is a kind of realism—in life, too, perpetrators go unpunished all the time—and Zink often excels at exploring such truths through comedy. But the ratio of buoyancy to ballast ultimately goes awry in "Mislaid," and I missed the moments in "The Wallcreeper," few but sufficient, when the bill came due.

Still, I did love one thing about the end of "Mislaid": the rise of a stealth protagonist. For nearly the entire book, Meg's daughter, Karen, lurks in the background, almost ghostly, her life just the falling dominoes of her parents' disastrous choices. Then, like Tiffany in "The Wallcreeper," she surges to sudden agency at the eleventh hour, and you realize that the bildungsroman you have been reading has, all along, belonged to her.

Those endings work because they are surprising, and because it is moving to witness the moment when someone finally finds the courage to take control of her own life. It seems telling that Zink is drawn to such stories right now. There are a lot of ways to stay safe as a writer: by not writing, by writing to no one, by writing to a single admirer, by challenging the judgment of those with the power to judge, by not putting much effort into your work. "It's hard," Zink writes in "The Wallcreeper," "trying to defend your territory and advertise your presence and keep out of predators' line of sight."

It is hard, but it is not impossible, as Zink herself now seems poised to prove. There were a lot of interesting birds in the Berlin birdhouse, but the one she looked at longest wasn't in the zoo at all. It was just outside, hanging out in the blustery spring air, a nondescript smudge on a tree that became a nondescript smudge in the sky. Zink watched as it flew off, and wondered aloud what it was. She had been trying hard, she told me, to learn the birds of Germany, without much success. There are hundreds of species, for one thing. But also, she said, compared with their New World counterparts, European birds are exceedingly drab. "They're all, you know, brown, with gray. Or gray, with brown. I saw a cardinal when I was in Brooklyn and I was almost moved to tears." What stirred her was the fact that a creature so brilliant could survive in plain sight. "I was, like, I can't believe this thing is legal. I can't believe this thing is in the wild. How did this happen, how has someone not killed them all? They're so conspicuous. They're gorgeous. How can they still be alive?" ♦



PLAYGROUND PURGATORY

BY COLIN NISSAN

ANNA: Is that your little guy over there?

SARA: Yeah, that's Sebastian.

ANNA: What a cutie. That's my Tessa on the slide.

SARA: She's adorable.

ANNA: I feel like I've definitely seen you here before. I'm Anna.

SARA: You look familiar, too. I'm Sara.

ANNA: Mind if I sit?

SARA: Please.

ANNA: We're here a lot, Tessa and I.

SARA: Yeah, this is like a second home for Sebastian and me.

ANNA: This place is such a lifesaver.

SARA: Total lifesaver.

ANNA: We're here every day. Sometimes twice.

SARA: Tell me about it, we were here for ten hours yesterday.

ANNA: I really treasure the time that Tessa and I spend here.

SARA: Wouldn't trade it for the world.

ANNA: I'm always so happy when I'm here, and never feel strange or despondent.

SARA: Me, too. So happy. The sound of all the kids laughing and screaming is so joyous, and doesn't sound anything like nails on a chalkboard.

ANNA: I've never cried behind that tree.

SARA: Me neither.

(*Pause*)

ANNA: Tessa! Tess! Come on over here and put on your coat, O.K., sweetheart? It's chilly out, and you need to put on your coat, O.K.? Your coat needs to go on your body. The fabric needs to cover your torso to help you maintain a proper internal temperature, or you'll die, O.K., pumpkin? You'll die of hypothermia, right here at the playground, unless you put your coat on. Your body's going to start shutting down soon. It'll feel like you're getting sleepy for nap time, but you'll actually be getting sleepy for dying. *Get your God-damned coat on!*

(*Pause*)

ANNA: Is that your little guy over there?

SARA: Yeah, that's Sebastian.

ANNA: What a cutie. That's my Tessa on the slide.

SARA: She's adorable.



ANNA: Wait. I'm sorry . . . did I already ask you that?

SARA: Did you? I don't think so.

ANNA: I'm so embarrassed.

SARA: Did I answer you again?

ANNA: I . . . don't know.

(*Pause*)

ANNA: I feel funny sometimes.

SARA: It's this place. It's evil.

ANNA: I'm scared.

SARA: There are dark forces here. Powerful forces.

ANNA: And yet it's the only place that makes sense to me anymore. Here and my bathroom.

SARA: Sometimes, when I'm in the sandbox, I can feel myself sinking, like something is pulling me down. I can feel the sand slowly surrounding me, suffocating me, and it feels good.

(*Pause*)

SARA: We should totally do a playdate sometime!

ANNA: Oh my God, it would be so great to do a playdate!

SARA: Maybe I'll buy us a bottle of Pinot Grigio. Nothing wrong with the moms playing a little at a playdate, right?

ANNA: Nothing wrong at all.

SARA: Hey, I don't know if you're into it, but I bet I could dig up a little pot in the back of a drawer somewhere, it's probably really old, but might be fun. Boy, listen to me, I sound like a total druggie! Ha.

ANNA: Ooh, no, that would be fun.

SARA: O.K., great.

(*Pause*)

ANNA: Just throwing it out there, I could probably score a line or two of coke if you wanted. We *totally* don't have to.

SARA: Well, I like what you're throwing! I'm definitely down for a bump or two. O.K., I'm just going to ask, do you have any interest at all in shooting a tiny bit of heroin? Oh my God, I'm such a bad influence! Ha!

ANNA: Wow, I don't know, let me think about that one. Thought about it. Hells yes!

(*Pause*)

SARA: Is that applesauce on your shirt?

ANNA: This? No, this is throw-up. Tessa regurgitated on me. But, applesauce or throw-up, what's the difference, really? They're both just things that get on your shirt that you lose the will to wipe off after a certain point, because either way you're going to give yourself a haircut with a kitchen knife, right?

SARA: So true.

ANNA: There's also string cheese in my hair, not sure if you saw that.

SARA: Last night, I found a cheddar Goldfish in my vagina.

ANNA: Wow.

SARA: Yeah.

ANNA: In it?

SARA: Right in it.

(*Pause*)

ANNA: Tessa! Honey! Share the slide, Honey Bear! We don't own the slide, O.K.? We have to share, because if we don't society will collapse and we'll become no better than animals, tearing one another limb from limb just to survive. This playground and everything around it will deteriorate into a

VICTOR KERLOW

dystopian war zone, a lawless heap of smoldering ash. And guess what dystopian war zones don't have? Slides. *Share the God-damned slide!*

(*Pause*)

SARA: Hey, look who just walked in.

ANNA: Where?

SARA: Over there, by Nanny Alley.

ANNA: Oh boy.

SARA: Stay-at-home Hottie McBjörn.

ANNA: Daddy's home.

SARA: Daddy's home, all right.

ANNA: Bad day for me to not shower.

SARA: Bad day for me to be twice my college weight.

ANNA: Oh my God, have you seen his wife?

SARA: No! You?

ANNA: She made an appearance here. Once. Working mom.

SARA: So sad.

ANNA: I know.

SARA: And?

ANNA: Meh.

SARA: He deserves more than that.

ANNA: So much more.

SARA: He's hurting.

ANNA: You'd never know it. He's so brave. And able. I saw him tie a water balloon with one hand before.

SARA: I saw him make a diaper out of leaves.

(*Pause*)

ANNA: Well, well, well, look over there by the monkey bars.

SARA: If it isn't Hot Skinny Bitch Mom.

ANNA: She's got some nerve. Ms. My Baby Weight Just Vanished Because I'm a Terrible Person.

SARA: Ms. I Carry a Yoga Mat on My Back Because You Never Know When I Might Just Start Fucking Doing Yoga.

ANNA: Ms. My Hair Is Washed.

SARA: Ms. I Went to Law School but Decided to Work Part Time at an Inner-City Nonprofit for At-Risk Youth So I Can Give Back to the Community Because I'm So-o-o-o-o-o-o-o Skinny!

ANNA: What?

SARA: Sorry, I don't know what that was.

(*Pause*)

ANNA: I love her outfit.

SARA: It's so cute I want to tear her little arms off.

ANNA: Tessa? Tess, honey! It's time for lunch, O.K.? Let's take a break and have something to eat now, because Mommy's hungry, too, and Mommy can't eat her lunch until you've eaten yours, because, as you know, Mommy's lunch is just the remnants of your lunch—your toast crusts, your milk backwash, and, with any luck, a frantic lick of your half-eaten yogurt container. O.K., Sugarplum? *Come eat your God-damned lunch!*

(*Pause*)

ANNA: Such a beautiful day here today.

SARA: It's perfect.

ANNA: Not a cloud in the sky.

SARA: Never is.

ANNA: I'm Anna, by the way. ♦



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ANNALS OF GAMES

WORLD WITHOUT END

Creating a full-scale digital cosmos.

BY RAFFI KHATCHADOURIAN



No Man's Sky will let virtual travellers explore eighteen quintillion full-featured planets.

The universe is being built in an old two-story building, in the town of Guildford, half an hour by train from London. About a dozen people are working on it. They sit at computer terminals in three rows on the building's first floor and, primarily by manipulating lines of code, they make mathematical rules that will determine the age and arrangement of virtual stars, the clustering of asteroid belts and moons and planets, the physics of gravity, the arc of orbits, the density and composition of atmospheres—rain, clear skies, overcast. Planets in the universe will be the size of real planets, and they will be separated from one another by light-years of digital space. A small fraction of them will support complex life. Because the designers are building their universe by establishing its laws of nature, rather than by hand-crafting its details, much about it remains unknown, even to them. They are scheduled to finish at the end of this year; at that time, they will invite millions of people to explore their creation, as a video game, packaged under the title No Man's Sky.

The game's chief architect is a thirty-four-year-old computer programmer named Sean Murray. He is tall and thin, with a beard and hair that he allows to wander beyond the boundaries of a trim; his uniform is a pair of bluejeans and a plaid shirt. In 2006, frustrated by the impersonal quality of corporate game development, Murray left a successful career with Electronic Arts, one of the largest manufacturers of video games in the world. He believes in small teams and in the idea that creativity emerges from constraint, and so, in 2008, he and three friends founded a tiny company called Hello Games, using money he raised by selling his home. Since then, its sole product has been a game called Joe Danger, about a down-and-out stuntman whose primary skill is jumping over stuff with a motorcycle. Joe Danger, released in several iterations, earned a reputation for playability and humor. (In one version, it is possible to perform stunts as a cupcake riding a bike.) But it was hardly the obvious predecessor to a fully formed digital cosmos. No Man's Sky will, for all practical purposes, be infinite. Players will begin at the outer edges of a galaxy containing 18,446,744,073,709,551,616 unique planets. By comparison, the game space of Grand Theft Auto: San Andreas appears to be about fourteen square miles.

From the moment Murray unveiled a hastily built trailer for No Man's Sky, in late 2013, on the Spike TV network, anticipation for the game has taken on an aspect of delirium. For a big-budget franchise like Grand Theft Auto—what people in the industry call a triple-A game—an "announcement trailer" typically features carefully scripted, action-filled vignettes that present a simulacrum of actual play. The No Man's Sky trailer, which was homemade, featured a minute or so of the actual game: a recording of Murray exploring a planet, beginning undersea, then boarding a ship, flying into space, and engaging in combat. The footage communicated nothing concrete about the game play, but the graphics were rendered with an artistic finesse rarely seen in games, and the arc of Murray's journey—the unbroken sweep from ocean to land to heavens—implied an unprecedented range of possible discovery.

Other video-game developers advised Murray not to release the trailer, fearing that it was too vague and unconventional, and for days he deliberated. But Murray is not short on self-assurance, and he believed that the footage evoked a near-universal childhood experience: gazing up at the stars and wondering what space might

HELLO GAMES



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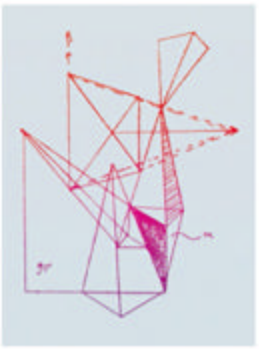
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be like. He decided to fly to Los Angeles and present the trailer himself, on the air. "Sean strikes me as incredibly driven and ambitious, but he is also polite and sweet about it," Joe Shrewsbury, whose band, 65daysofstatic, is writing the game's soundtrack, told me. Murray, who describes himself as an introvert, says that studio lights terrify him—in keeping with a habit of self-effacement that another colleague described as "the nervous-guy shtick."



On the Spike TV set, Murray looked downward, as if shielding his eyes, but he also projected fanboy enthusiasm. "It is a huge game," he said. "I can't really do it justice. We wanted to make a game about exploration, and we wanted to make something that was real." Nearly all video games rely on digital façades, drawn by artists, to give the illusion of an explorable world that is far larger than it really is, but No Man's Sky will contain no such contrivance. Murray's trailer featured luxuriant scenes of crashed ships on arctic terrain, giant sandworms—a galaxy of exotic dangers. "That planet on the horizon, which you see on the trailer, that's a real place," he said on the set. At the time, Murray was working on the game with only three other people, and when he told the show's hosts they reacted incredulously. "If it is nighttime, and you are in space, and you see stars, those are real stars," he added. "Those are suns, and they have planets around them—and you can go and visit them."

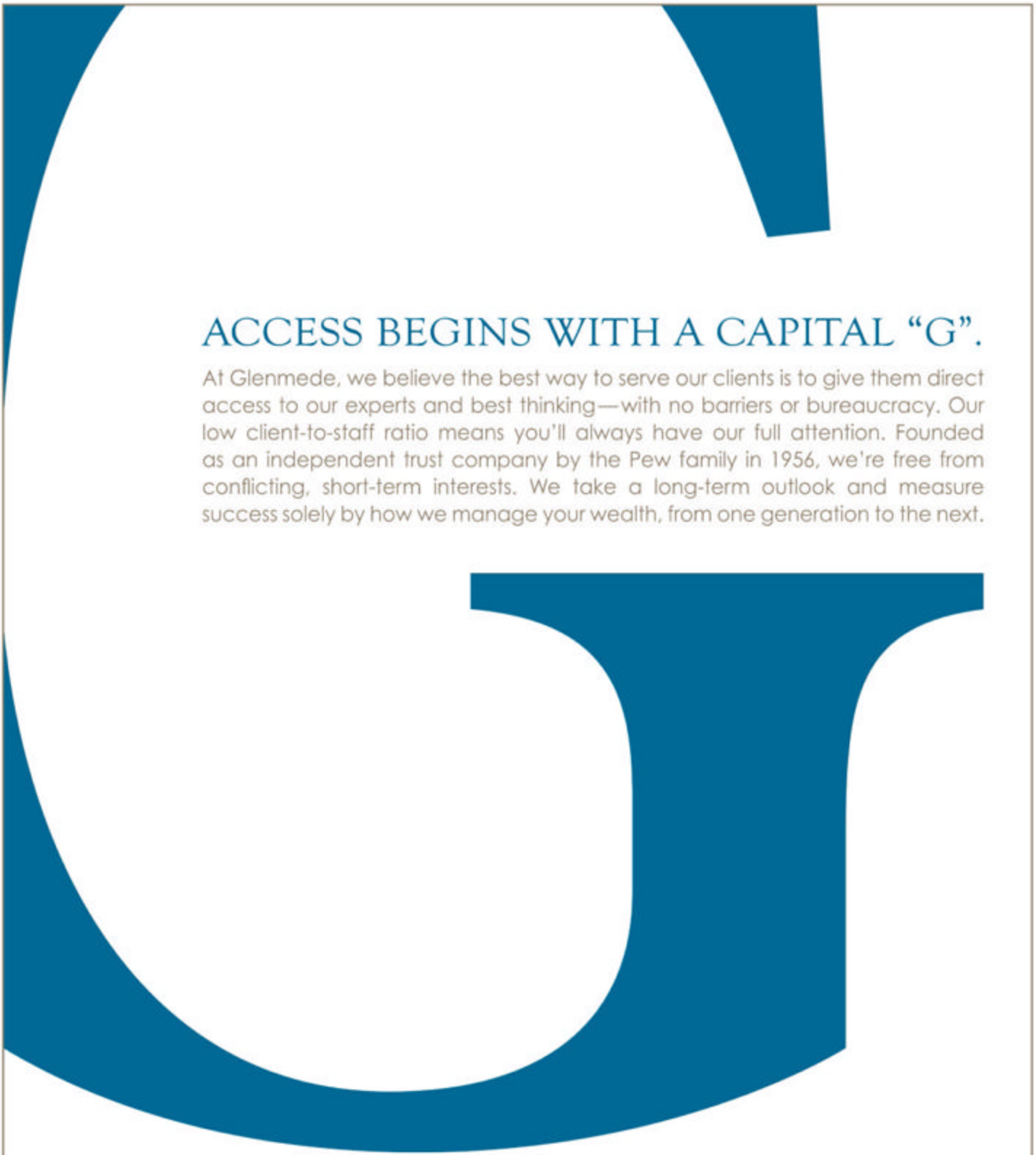
When I first met with Murray, at his studio, earlier this year, he had just flown back from the North American headquarters of Sony PlayStation, in California. He had a long relationship with Sony. A few days before he unveiled the No Man's Sky trailer, in 2013, he had distributed versions of it to people in the industry, and Sony had been immediately interested. "I sent Sean a barrage of texts," Shahid Ahmad, a director of strategic content at Sony PlayStation, told me. "I said, 'We need to get this on PlayStation. Tell me what you need.'"

Two weeks later, on Christmas Eve, a tributary of the Thames overflowed in Guildford, flooding the Hello Games studio. Murray rushed over and found laptops floating in waist-deep water; tens of thousands of dollars' worth of equipment was destroyed. Sony's offer of assistance remained, but Murray told me that he did not ask for funding. Unlike Hollywood, the video-game industry is marked by a vast chasm between big-budget productions and independent ones, and he had learned with Joe Danger that a small studio could easily become beholden to a distributor. Instead, he requested Sony's help in securing a place for No Man's Sky at the Electronic Entertainment Expo, or E3, the largest gaming trade show in America. No independently produced title had ever been featured on the main stage, but, as he recalled, "I said—and this was really cocky—'We want to own E3.' They were, like, 'That's not going to happen,' but we pushed for it. We traded working for them for being onstage." (Ahmad told me that the hesitation was largely logistical: "E3 takes time to plan.")

Sony agreed, and also decided to throw its resources into promoting No Man's Sky as a top title—an unprecedented gesture for an unfinished product by a tiny studio. The video-game industry now rivals Hollywood; by one estimate, it generated more than eighty billion dollars in revenue last year, and marketing budgets for triple-A games have become comparable to those of blockbuster films. Sony's marketing strategy for No Man's Sky suggests that it expects the game to make hundreds of millions of dollars; this year, Sony will promote it alongside half a dozen mega-titles, including the latest installment of the Batman franchise. Adam Boyes, a vice-president at Sony PlayStation, described it to me as "potentially one of the biggest games in the history of our industry."

All Murray has to do now is deliver. Last year, when an interviewer asked him when the universe would be ready, he said, "We are this super-small team, and we are making this ridiculously ambitious game, and all we are going to do in telling people when it is going to come out, probably, is disappoint them." Sony's participation meant that timing for the game's launch had to be firmly decided, but No Man's Sky is not an easy project to rush. Because of its algorithmic structure, nearly everything in it is interconnected: changes to the handling of a ship can affect the way insects fly. The universe must be developed holistically; sometimes it must be deconstructed entirely, then reassembled. Before I arrived, Murray warned me, "The game is on the operating table, so you will see it in parts. Other games will have the benefit of having a level that plays really well, while the studio works on other levels. We don't have that." The previous "builds" of No Man's Sky that he had publicly shown—the ones that had generated so much excitement—contained choreographed elements. Features that might have been light-years apart were pressed closer together; animals were invisibly corralled so that they could be reliably encountered. Shifts in the weather that would normally follow the rhythm of atmospheric change were cued to insure that they happened during a demo. Imagine trying to convey life on Earth in minutes: shortcuts would have to be taken.

We were in a lounge on the second floor of the renovated studio; concept art hung beside a whiteboard covered with Post-its. The furniture was bright, simple, IKEA. Sitting in front of a flat-screen TV the size of a Hummer windshield, Murray loaded up a demo of the game that he had created for E3: a solar system of six planets. Hoping to preserve a sense of discovery in the game, he has been elusive about how it will play, but he has shared some details. Every player will begin on a randomly chosen planet at the outer perimeter of a galaxy. The goal is to head toward the center, to uncover a fundamental mystery, but how players do that, or even whether they choose to do so, is open to them. People can mine, trade, fight, or merely



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explore. As planets are discovered, information about them (including the names of their discoverers) is loaded onto a galactic map that is updated through the Internet. But, because of the game's near-limitless proportions, players will rarely encounter one another by chance. As they move toward the center, the game will get harder, and the worlds—the terrain, the fauna and flora—will become more alien, more surreal.

Sitting in the lounge, we began on a Pez-colored planet called Oria V. Murray is known for nervously hovering during demos. "I'll walk around a little, then I'll let you have the controller for a bit," he said. I watched as he traversed a field of orange grass, passing cyan ferns and indigo shrubs, down to a lagoon inhabited by dinosaurs and antelope. After three planets and five minutes, he handed me the controller, leaving me in a brilliantly colored dreamscape, with crystal formations, viridescent and sapphire, scattered in clusters on arid earth. Single-leaf flora the height of redwoods swayed like seaweed. I wandered over hills and came to a sea the color of lava and waded in. The sea was devoid of life. With the press of a button, I activated a jet pack and popped into the air. Fog hung across the sea, and Murray pointed to the hazy outline of distant cliffs. "There are some sort of caves over there," he said, and I headed for them. The No Man's Sky cosmos was shaped by an ideal form of wildness—mathematical noise—and the caves were as uncharted as any material caves. I climbed into one of them. "Let's see how big it is," Murray said.

The cave's interior was rendered in blues, greens, purples, and browns, and the light filled it with warmth. Luminescent bits of matter, like inanimate fireflies, filled the air. Triple-A games are often self-serious, dominated by hues so dark they nearly seem black, but Murray favors vivid, polychromatic graphics. "I think that one of the reasons No Man's Sky resonates is that, at a very reductive level, it's bright—it's colorful, vibrant," he told me.

The game is an homage to the science fiction that Murray loved when he was growing up—Asimov, Clarke, Heinlein—and to the illustrations that often accompanied the stories. In the nineteen-seventies and eighties, sci-fi book covers often bore little relation to the stories within; sometimes they were commissioned independently, and in bulk, and for an imaginative teen-ager it was a special pleasure to imbue the imagery with its own history and drama. Space was presented as a romantic frontier, sublime in its vastness, where ships and futuristic architecture scaled to monumental proportions could appear simultaneously awesome and diminutive. Danger was a by-product of exploration: rockets that crashed on barren asteroids; plots by haywire computers; ominous riddles left behind by lost civilizations. "But inherently what is going on is optimistic," Murray said. "You would read it and go, Wow, I would love to be this person—this is so exciting. Whereas at the moment a lot of sci-fi

SHEFFIELD MOUNTAIN ODE

(For Galway Kinnell)

And then, in the morning, the stillness of the quiet
skirts of the dark, on the ground, around
the full-moon trees, 4 A.M.—
I can feel the moon *moving*, actually
circling us, as we seem to circle
the sun, as we rotate toward it, the Sheffield
mountain like the corolla of a flower
turning toward our birth star. Before I leave,
I go into his room, where there is the being
suffering. "*Oh!*—it's still
da-ark," I say, with the falling music of
surprise on *dark*. "*Ye*-es," he says,
on the same notes, like a rhyme with the music.
Then he groans, prone on the bed, holding to the
covers, holding to the turning earth,
and he sleeps. It is just past the Days of Awe—
the New Year, and Yom Kippur,
days and evening at temple with my love—
"I hope you have an easy fast,"
I whisper to my friend, who is never again,
soon, to eat the food of this life which is the
only food we will have. "Thank you
for being my best friend," and my voice
warbles like the first bird of the morning.
Oom pompa *noo* suc—you fish your side
of the river, I'll fish mine, you said
it meant—and I can see us, decades,
fishing both sides of the river,
together, sharing the catch. Safe
travels, I say to the shape in the hospice
bed, the metal of which catches light to make
a constellation. Then I'm going past a plowed
field, water in the valleys of the harrow's
talons, on the water the upside-down
crowns of bare trees, mist above the creek
rising like fine baby hair, I am
driving as the crow flies,
beside the crow.

—*Sharon Olds*

is dystopian, and you go, I would hate to be this person. How would I deal with it?"

No Man's Sky's references may be dime-store fiction, but the game reimagines the work with a sense of nostalgia and a knowing style that is often more sophisticated than the original. "One thing a lot of video games are missing is a very confident sense of style," Frank Lantz, the director of New York University's Game Center, told me. "No Man's Sky has a *personality*."

I approached a cave that looked out on the sea, and Murray gestured toward a portion of the digital geology. "I haven't seen that before," he said, and took the controller to get a better look. Murray's primary coding contribution is to planetary terrain, and he had developed a special appreciation for such formations. After exploring for a bit, he said, "Sorry. You can have the controller back."

From inside the cave, I turned and approached an opening that looked out upon a ridge high above the shore. "What happens if I jump off?" I asked.

"You'll be fine," he said. "We didn't want you to break your legs and get hurt. It is about exploring. We didn't want people feeling nervous."

Each planet had a distinct biome. On one, we encountered a friendly-looking piscine-cetacean hybrid with a bulbous head. (Even aggressive creatures in the game do not look grotesque.) In another, granular soil the color of baked salt was embedded with red coral; a planet hung in the sky, and a hovering robot traversed the horizon. "Those are drones," Murray said. "They will attack you if they find you killing animals or illegally mining resources." On a grassy planet, doe-eyed antelope with zebra legs grazed around us. Mist rose off the grass as I headed down a ravine shaded by trees. "This is a place where no one has been before," Murray said. The biome was Earth-like in light and in color, naturalistic. As I descended, the ravine deepened until rock façades took shape on either side. In spite of the work's semi-finished state, the world was absorbing. "I'm sorry there's no gameplay element on this planet yet," Murray said. His mind turned from the screen in front of us—the six planets, tidily assembled for the demo—to the full version of No Man's Sky on the operating table on the studio's first floor, below us. Until many improvements were fully realized, the whole of it would inevitably look worse than what we were seeing. "You can lose sight that it once looked like this," he said.

This version of the game—a frequent reference point for the studio—was a reminder of a public promise: the presentation that Murray had given at E3, where he stood on a huge stage with images of No Man's Sky projected onto ninety-foot screens. "There were five thousand people in the audience, and at least five million watching at home," he told me. "I sat backstage, and, before walking out, I had a feeling that I could go to sleep—just turn around and go." One of the studio's programmers who was with Murray backstage recalled, "Sean got whiter and whiter—he was just catatonic." To overcome his nerves, Murray focussed his mind on the story of the game, beginning with the studio's origins. He told me, "By the time I walked out, I could have burst into tears, because what I was going to say was that this is basically the game I've always wanted to make."

Murray's earliest memories are of life on a cane farm in Brisbane, Australia. He was born in Ireland, but his parents migrated to Australia when he was two years old. "We basically lived in a glorified shed," he told me. "It was up on stilts, and it had a corrugated-iron roof." Two years later, Murray's parents moved again, to work on a remote million-acre ranch in Queensland. The settlement resembled an alien outpost, with its own power-generation system and its water pumped on-site. Visitors who wanted to avoid a four-hundred-mile drive on a rutted track had to fly in. (The ranch had seven airstrips and an abandoned gold mine.) Dust storms swept across the desiccated soil. Merely crossing the property was like an expedition. "You would go out to check that the windmill, or whatever, was working," he said. "And you always had to go out in twos. As a kid, you were told that, if something happened to the person you were with, then find some shade, and if there is no shade don't go looking for it. You will survive for three days without water and without food, and so you have only one job: gather kindling to light a fire. You stay exactly in the same place, and you light a fire at set times, and that's it. There is a plan: we can fly over, and in three days we can cover the whole grid." Murray often accompanied his father on multi-day treks. At night, they camped under pristine night sky, with all of space arcing above them.

In the outback, Murray became fascinated with sci-fi. When he first encountered "Dune," he said, "I can remember being hungry reading it, forgetting to eat." Years later, when he formed Hello Games, he told his co-founders—two coders named Ryan Doyle and David Ream and an artist named Grant Duncan—to consider their childhoods as source material for games. "I said, 'Think back to when you were a kid. What did you want to be? A cowboy, an astronaut, a stuntman, a fireman, a policeman, whatever.' " Working in Murray's living room, the four men at first devoted their attention to fundamentals, writing software to determine how objects would behave in a theoretical game space. "We mentioned Pixar a lot, because their work is colorful but not childish," Duncan told me. The inspiration for Joe Danger came from a stuntman figure that Duncan found in a box of old toys.

The partners worked for a year, and went nearly broke. "I had sold off my PS3," Murray told me, referring to his PlayStation. "We were down to the bare essentials." For the release, in June, 2010, Murray bought some cheap cider. "We decided, we are going to drink cider, and it will come out and do what it will do," Murray said. The game did not appear online in the United Kingdom until after midnight. When it first loaded, the screen was black, causing momentary panic. But within an hour the partners had made back their money.

Murray started No Man's Sky one morning two years later, during a difficult negotiation with Microsoft over

the marketing for Joe Danger's sequel. "Everyone else was at home," he recalled. "I was in the studio on my own, and I just started programming. I was furious, and I kept working until three in the morning. Looking back, I think I had the equivalent of a midlife career crisis. What is the point of these games? Like, Joe Danger—how impactful is it?" Murray and his cofounders had joked that they would one day make an ambitious game, which they called Project Skyscraper. The following day, he told Duncan and Ream, "We're doing it." He had created only a small patch of sample terrain, without a clear sense of what it would be, and Ream told me, "The thing was quite abstract, and we were like, What are you *doing*?" Duncan was skeptical. Artists he knew were dismissive of the technique that Murray was using; one had warned him that the results "look like shit."

Duncan and Ream began to design a relatively conventional game, in the mold of Joe Danger—another humorous take on a childhood dream profession. Their working title was Space Cadets. But Murray urged them to consider the project in more open-ended terms. "I had this feeling: I want to start a new company, like almost an alternate path for Hello Games," he told me. He split his company into two, and for months the three men, along with a coder named Hazel McKendrick, worked on No Man's Sky in secrecy, in a locked room.



To build a triple-A game, hundreds of artists and programmers collaborate in tight coördination: nearly every pixel in Grand Theft Auto's game space has been attentively worked out by hand. Murray realized early that the only way a small team could build a title of comparable impact was by using procedural generation, in which digital environments are created by equations that process strings of random numbers. The approach had been used in 1984, for a space game called Elite, which Murray played as a child. Mark Riedl, the director of Georgia Tech's Entertainment Intelligence Lab, told me, "Back in those days, games had a lot of procedural generation, because memory on computers was very small; it was largely forgotten, but now it is being rediscovered." (Minecraft, an expansive world that was designed by only one person, also uses the technique.) Games based on procedural generation often suffer from unrelenting sameness, marked by easily detectable algorithmic patterns (imagine a row of more or less identical trees, stretching to infinity), or from visual turmoil. But Murray hoped that if a middle ground could be achieved he could create graphically rich environments worthy of discovery—a fictional version of exploration that had a grain of reality to it.

Once Murray decided on the basic mathematical architecture of the game, he needed random numbers to feed into it. No computer can generate true randomness, but programmers use a variety of algorithms, and sometimes the physical limitations of the machine, to create approximations. "Computers can understand numbers only of a set size," Murray told me. "When you are building a computer, you are literally saying, This is where a number gets stored, and this is how many digits can fit in that space." For a game console, that space is sixty-four bits. When a player first turns on No Man's Sky, a "seed" number—currently, the phone number of a programmer at Hello Games—is plugged into an equation, to generate long strings of numbers, and when the computer tries to store them in that sixty-four-bit space they become arbitrarily truncated. "What you are left with is a random number," Murray said. The seed defines the overall structure of the galaxy, and the random numbers spawned from it serve as digital markers for stars. The process is then repeated: each star's number becomes a seed that defines its orbiting planets, and the planetary numbers are used as seeds to define the qualities of planetary terrain, atmosphere, and ecology. In this way, the system combines entropy and structure: if two players begin with the same seed and the same formulas, they will experience identical environments.

The design allows for extraordinary economy in computer processing: the terrain for eighteen quintillion unique planets flows out of only fourteen hundred lines of code. Because all the necessary visual information in the game is described by formulas, nothing needs to be rendered graphically until a player encounters it. Murray compared the process to a sine curve: one simple equation can define a limitless contour of hills and valleys—with every point on that contour generated independently of every other. "This is a lovely thing," he said. "It means I don't need to calculate anything before or after that point." In the same way, the game continuously identifies a player's location, and then renders only what is visible. Turn away from a mountain, an antelope, a star system, and it will vanish just as quickly as it appeared. "You can get philosophical about it," Murray once said. "Does that planet exist before you visit it? Sort of not—until the maths create it."

Initially, the system proved fantastically difficult to control. It was generating planetary terrain that was wild, alien-seeming, and also impossible to traverse. If Murray pushed the system in the other direction, the terrain became dull and repetitive. There were also specific natural features, such as rivers, that did not lend themselves easily to equations. To make a river in a conventional game, an artist creates a mountain, places a digital drop of water on it, and maps the water's trajectory downward. "That is the correct way," Murray told me. But the process involves laborious computation, and requires that the topography be known in advance. Because of No Man's Sky's algorithmic structure—with every pixel rendered on the fly—the topography would not be known until the moment of encounter. Theoretically, the game could quickly render a sample of the terrain before deciding that a particular pixel belonged to a river, but then it would also have to render a sample of the terrain surrounding that sample, and so on. "What would end up happening

is what we call an intractable problem to which there is only a brute-force solution," Murray said. "There's no way to know without calculating everything." After much trial and error, he devised a mathematical sleight of hand to resolve the problem. Otherwise, the computer would have become mired in building an entire world merely to determine the existence of a drop of water.

Every morning, at a little past ten, Murray leads a brief meeting with his team. A dozen coders and artists stand among the rows of computers, or swivel their chairs around. In a quick rundown, problems are identified, goals set; in the evening, work is checked into a master build. Murray delegates readily but watchfully.

During my visit, four artists outlined their plans, and then sat down to work. The artists devise archetypes for the coders' algorithms to mutate. One spent a day making insects: looking up images on Pinterest, designing features for an insect archetype, studying how the algorithms deformed the archetype in hundreds of permutations, then making corrections. "It's a constant slog of iterating and polishing," the art director, Grant Duncan, told me. He was working that day on architectural modules that could be combined in myriad ways. Because small changes can have unpredictable effects—the color of a single plant infecting every tree, rock, and animal on a planet—his team uses an algorithmic "drone" that navigates the universe, taking snapshots to measure the repercussions of decisions. Occasionally, Duncan stopped his work to offer suggestions. Reviewing some insects, he said, "Except for the colors, these shapes are kind of working—but the others are bonkers."

Murray sat down with David Ream, whose focus is coding the game-play systems. Ream had been working to make spaceships handle more realistically in flight, and he wanted Murray to test his work. "I have to give the controller to Sean, because I find that I naturally play the game so that it works, because I know all the numbers," Ream said. "And also because we have our strong bonds, so I can tell Sean to fuck off."



"The hardest part of homework is keeping my parents motivated."

• •

Murray played for a few minutes, dogfighting with enemy ships. "This is so much more enjoyable than it was on Sunday," he said. But he was worried that excessive realism would confuse players who were unaccustomed to the frictionless quality of motion in space. He suggested some tweaks. During the testing, Murray noticed that his ship had exited a planet's atmosphere too rapidly, without the drama it had in the E3 build. "We're missing something that used to be there," he said. "It was a surprise to be suddenly in space."

Hazel McKendrick walked over and said, "The atmosphere isn't as thick." She had adjusted formulas to provide a more natural effect of sunlight passing through it, and a better view of nearby planets. To re-create the old feel, she suggested, the atmosphere's depth could be artificially increased as the ship passes through.

"So, annoyingly, by doing it wrong you get a nicer effect," Ream said.

Throughout the day, other members of the team worked on shadows, on creature artificial intelligence, on imbuing objects with "collision," or physicality. After a coder gave trees and rocks collision, they became destroyable; he shot at a hillside, causing rocks to tumble down, hitting one another in a cascade. Peculiar problems had emerged from the sphericality of planets; in conventional video games, digital spaces are perfectly flat. Until gravity was precisely calibrated, objects sometimes fell off planets. One of the programmers, Charlie Tangora, described a problem with cowlike creatures that kept walking on cave ceilings; it took some troubleshooting before he realized, "Oh, wow. You're in the Southern Hemisphere. Everything is upside down."

When Murray wasn't being pulled away from his computer, he worked on the terrain. He told me that he was always searching for ideas. Last year, he saw the film "Interstellar," which features scenes of a lifeless snowy planet that "had some very perfect 'mathlike' terrain." The next day, he developed formulas that would create

similar crevasses. More recently, he had noticed geological formations that an artist had hand-designed for another video game, and realized that the algorithms of No Man's Sky were not equipped to make them. The problem nagged at him, until he found an equation, published in 2003 by a Belgian plant geneticist named Johan Gielis. The simple equation can describe a large number of natural forms—the contours of diatoms, starfish, spiderwebs, shells, snowflakes, crystals. Even Gielis was amazed at the range when he plugged it into modelling software. "All these beautiful shapes came rolling out," he told *Nature*. "It seemed too good to be true—I spent two years thinking, What did I do wrong? and How come no one else has discovered it?" Gielis called his equation the Superformula.

Murray, sitting before his monitor, typed the Superformula into the terrain of a test planet. He began simply, creating walnut-shaped forms that floated in an infinite grid over a desert. The image resembled a nineteen-eighties album cover, but the over-all look was not the point. Whenever he refreshed the rendering, the floating shapes changed. Many were asymmetrical, marred by depressions and rivulets. Game designers refer to lines of code that require lots of processing time as "costly." The Superformula is cheap.

"One of the hardest things for us to do is to create coherent shapes," he told me as he worked. In order to produce varied landscapes, a formula must be able to cope with a wide range of random information without generating mathematical anomalies that cause glitches. "This sounds ridiculous, but it is hard to find a formula that you can rely on," he said. The Superformula appeared to be reliable. He pointed to a rocky overhang, which looked like desert geology sculpted by harsh erosion. "This is quite naturalistic," he said. He added more noise to the formula, rotated the shapes it made, played with their scale, buried them beneath the planet surface. "This is effectively more turbulence entering the maths." He envisioned using the Superformula throughout the game, especially at the center of the galaxy, where landscapes would become more surreal. With only small shifts in its parameters, the equation was producing impressive variability. In one rendering, it produced rolling hills. Murray refreshed the screen: a star-shaped rock formation appeared. He seemed pleased. "It's always a good sign when I am clicking the button, and there is that slight amount of excitement," he said.

The allure of taking one more peek at the unknown had a way of distracting even the game's creators. At one point, I sat next to Duncan, who was populating a test planet with alien fungus. "I'm trying to develop some weirder vegetation," he told me. Birds flew high above a towering black obelisk—space architecture inspired by John Harris, a British illustrator. Duncan had activated the bird algorithm, but, oddly, a herbivorous dinosaur had also appeared. "I made this world for this test, and I have never encountered animals on it before," he said. "I don't know what it's going to do." The dinosaur scampered off. After several minutes, I asked what attributes of the fungus he was studying. "I'm just exploring," he said, sheepishly. "Sometimes I'm, like, What am I *doing*? I'm supposed to be working."



"Thank you for neglecting your work long enough to listen to my thoughts on efficiency."

By May, the team was working furiously. Murray's hair and beard were growing wilder. Discussions with Sony became more complicated; the company was banking on No Man's Sky as a genre-defying hit, and, as its marketers began to consider different ways to promote it, the story of the game was slipping from his full control. Murray told me that he couldn't sleep at night. "The biggest worry for me is that we release the game because of all the momentum behind it before we are happy with it," he said. Because of the game's scope, and because he had decided not to reveal key features, he feared that it had become a Rorschach test of popular expectation, with each potential player looking for something in it that might not be there. "Hype is a difficult taskmaster," David Braben, one of the creators of Elite, told me when I asked

him what he thought about the game.

Even a feature as simple as the Superformula—a hundred and twenty lines of code—created complications when it was written into the terrain-generation system. When I asked Murray how it was working, he told me, "It's cool, though it currently plays hell with creature A.I." He was spending as much time as he could coding, but distractions were hard to block.

People at Sony wanted to issue a companion book, and, once he realized that it might be inevitable, he decided to get involved. One afternoon, he met with Dave Gibbons, the co-creator of the "Watchmen" comic series, to discuss his possible role as editor. In the upstairs lounge, they talked excitedly about Philip K. Dick, and about "Terran Trade Authority," an old sci-fi series that Murray had loved. Then Murray turned toward the flat-screen TV and brought Gibbons onto a snowy mountainous planet, from a build that had been created after E3. "A living, breathing universe," he said. "I can walk in any direction for days and days, and I will eventually walk the entire planet and come back to where I started."

"So you could really explore one planet and map it," Gibbons said.

"For some people, that will be all they do, and they'll be able to have quite a nice game," Murray said. He climbed into a ship, and flew through an asteroid belt. "The thing that we haven't really shown publicly, but I think is really cool, is that if I press a button I can pop out to a galactic map," he said. He pressed a button, and all of space shrank into a pinpoint of light, representing that solar system.

The galactic map—as bright and compelling as an image from a Carl Sagan documentary—gave the ship's location by framing its proximate sun in a white square. A panel of text noted the solar system's computer-generated name, Ethaedair; a diagram of vectors indicated stars that were reachable with the ship's hyperdrive. "This has been in games before, but it has always been a fake," Murray said, gesturing to the map. "Normally, it would be a painting that somebody has made, and there would be two little levels that you can go between, or ten levels, each set on a pretend 'solar system.'" Like a magician working toward a showstopper, he added, offhandedly, "But it is quite nice to just pull around . . ." He manipulated his controller, and all of space rotated around Ethaedair's sun. Stars and plumes of luminous cosmic matter arced past; what had seemed like a two-dimensional representation suddenly revealed itself to be full of depth. Gibbons gasped, and Murray began to speak more softly: "If I pull back a bit, you start to get a sense of the size of what we are building." Millions of stars drifted by. Gibbons laughed softly. "It's like a huge box of chocolates!" he said.

"Maybe I should just go a little faster," Murray said. Light-years of space unfolded at a terrific rate. It may not have been the universe as it actually was, but there was nonetheless an awesome reality on display: the system's vast mathematics. Murray turned toward a phosphorescent glowing orb. "That's the center," he said. This version of the game allowed Murray to leap to any solar system he wanted, but, drawing out the suspense, he moved deeper into the galactic map's three-dimensional space. "This build was brought together so I could do a demo onstage. I chickened out, because when I press this button, basically, I don't know what we're going to see—and it can be a really weird way to end a demo. Something might go terribly wrong. Or we might find a planet that is quite boring. But I can see now that I should have gone with it, because even when it is boring it still is something new."

"It is a bit like it really does exist, isn't it?" Gibbons said.

Murray stopped at a star cluster and admired its density. Finally, overcoming his hesitancy, he picked a destination. "I can't promise if this is going to be interesting," he said. The map vanished. He was back in his cockpit. His hyperdrive kicked on. Then all of space blurred, and the ship hurtled into the unknown. ♦

CONSTABULARY NOTES FROM ALL OVER

From the Oak Harbor (Wash.) News-Times.

At 6:52 a.m., a Harold Street resident reported that there was a squirrel in his backyard walking in circles. The man said he was afraid to go and help the critter because someone might videotape him and post it on Youtube.







LETTER FROM CALIFORNIA

TOMORROW'S ADVANCE MAN

Marc Andreessen's plan to win the future.

BY TAD FRIEND

On a bright October morning, Suhail Doshi drove to Silicon Valley in his parents' Honda Civic, carrying a laptop with a twelve-slide presentation that was surely worth at least fifty million dollars. Doshi, the twenty-six-year-old C.E.O. of a data-analytics startup called Mixpanel, had come from San Francisco to Sand Hill Road in Menlo Park, where many of the world's most prestigious venture-capital firms cluster, to pitch Andreessen Horowitz, the road's newest and most unusual firm. Inside the offices, he stood at the head of a massive beechwood conference table to address the firm's deal team and its seven general partners—the men who venture the money, take a seat on the board, and fire the entrepreneur if things go wrong.

Marc Andreessen, the firm's cofounder, fixed his gaze on Doshi as he disinfected his germless hands with a sanitizing wipe. Andreessen is forty-three years old and six feet five inches tall, with a cranium so large, bald, and oblong that you can't help but think of words like "jumbo" and "Grade A." Two decades ago, he was the animating spirit of Netscape, the Web browser that launched the Internet boom. In many respects, he is the quintessential Silicon Valley venture capitalist: an imposing, fortyish, long-celebrated white man. (*Forbes*'s Midas List of the top hundred V.C.s includes just five women.) But, whereas most V.C.s maintain a casual-Friday vibe, Andreessen seethes with beliefs. He's an evangelist for the church of technology, afire to reorder life as we know it. He believes that tech products will soon erase such primitive behaviors as paying cash (Bitcoin), eating cooked food (Soylent), and enduring a world unimproved by virtual reality (Oculus VR). He believes that Silicon Valley is mission control for mankind, which is therefore on a steep trajectory toward perfection. And when he so argues, fire-hosing you with syllogisms and data points and pre-refuting every potential rebuttal, he's very persuasive.

Doshi, lean and quizzical in a maroon T-shirt and jeans, began his pitch by declaring, "Most of the world will make decisions by either guessing or using their gut. They will be either lucky or wrong." Far better to apply Mixpanel's analytics, which enable mobile-based companies to know exactly who their customers are and how they use their apps. Doshi rapidly escalated to rhetoric—"We want to do data science for every single market in the world"—that would sound bumptious anywhere but on Sand Hill Road, where the young guy in jeans is obligated to astound the middle-aged guys in cashmere V-necks. "Mediocre V.C.s want to see that your company has traction," Doshi told me. "The top V.C.s want you to show them you can invent the future."

If you have a crackerjack idea, one of your stops on Sand Hill Road will be Andreessen Horowitz, often referred to by its alphanumeric URL, a16z. (There are sixteen letters between the "a" in Andreessen and the "z" in Horowitz.) Since the firm was launched, six years ago, it has vaulted into the top echelon of venture concerns. Competing V.C.s, disturbed by its speed and its power and the lavish prices it paid for deals, gave it another nickname: AHo. Each year, three thousand startups approach a16z with a "warm intro" from someone the firm knows. A16z invests in fifteen. Of those, at least ten will fold, three or four will prosper, and one might soar to be worth more than a billion dollars—a "unicorn," in the local parlance. With great luck, once a decade that unicorn will become a Google or a Facebook and return the V.C.'s money a thousand times over: the storied 1,000x. There are eight hundred and three V.C. firms in the U.S., and last year they spent forty-eight billion dollars chasing that dream.

Doshi had run the gantlet before. In 2012, he tracked down Andreessen and his equally if less splendidly bald cofounder, Ben Horowitz, at a Ritz-Carlton near Tucson. Then he pitched them in the lobby (having made sure that his parents' Honda, which contained his father, was well out of sight). Doshi mentioned that he'd become so dissatisfied with the incumbent database software that he'd built his own. Andreessen later told me that this "was like a cub reporter saying, 'I need to write the Great American Novel before I can really file this story.'" A16z gave Doshi ten million dollars, and he gave it twenty-five per cent of his company.

Now he was back for more. He zipped through his slides: hundred-per-cent growth rate; head count doubling every six to nine months; and he still had all the money he'd raised last time. As Andreessen drank an iced tea in two gulps and began to roam the room, Doshi called up a slide that showed his competitors—Localytics, Amplitude, Google Analytics—grouped into quadrants. Then he explained how he'd crush each quadrant. "I want to buy a machine-learning team, I want to buy cutting-edge server hardware," he said. Indicating his all-but-obliterated competitors, he added, "I want to buy stuff no one here can afford." He jammed his hands in his pockets: questions?

While entrepreneurs attack with historiography—"The great-man view of history is correct, and I am that great man!"—V.C.s defend with doubletalk. "You're definitely going to get funded!" means "But not by us." "Who else is in?" means "Besides not us." And "I'm not sure I would ever use your product myself" means "So long!" But the best



At his firm, Andreessen Horowitz, the venture capitalist routinely lays out "what will happen in the next ten, twenty, thirty years."

PHOTOGRAPH BY JOE PUGLIESE

V.C.s test the entrepreneur's mettle as well as their own assumptions. Andreessen gripped the back of his chair. "So one way to describe what you're doing is a network effect," he said. "More data gives you more customers, which allows you to build more services, which gives you more data, which allows you to get more customers, and you just turn the crank." Doshi thought this over and said, "Sure!" Andreessen grinned: he's a systems thinker, and he'd grasped how Mixpanel fit into the system. After the pitch, he told me that Mixpanel is "a picks-and-shovels business right in the middle of the gold rush."

When a startup is just an idea and a few employees, it looks for seed-round funding. When it has a product that early adopters like—or when it's run through its seed-round money—it tries to raise an A round. Once the product catches on, it's time for a B round, and on the rounds go. Most V.C.s contemplating an investment in one of these early rounds consider the same factors. "The bottom seventy per cent of V.C.s just go down a checklist," Jordan Cooper, a New York entrepreneur and V.C., said. "Monthly recurring revenue? Founder with experience? Good sales pipeline? X per cent of month-over-month growth?" V.C.s also pattern-match. If the kids are into Snapchat, fund things like it: Yik Yak, Streetchat, ooVoo. Or, at a slightly deeper level, if two dropouts from Stanford's computer-science Ph.D. program created Google, fund more Stanford C.S.P. dropouts, because they blend superior capacity with monetizable dissatisfaction.

Venture capitalists with a knack for the 1,000x know that true innovations don't follow a pattern. The future is always stranger than we expect: mobile phones and the Internet, not flying cars. Doug Leone, one of the leaders of Sequoia Capital Partners, by consensus Silicon Valley's top firm, said, "The biggest outcomes come when you break your previous mental model. The black-swan events of the past forty years—the PC, the router, the Internet, the iPhone—nobody had theses around those. So what's useful to us is having Dumbo ears." A great V.C. keeps his ears pricked for a disturbing story with the elements of a fairy tale. This tale begins in another age (which happens to be the future), and features a lowborn hero who knows a secret from his hardscrabble experience. The hero encounters royalty (the V.C.s) who test him, and he harnesses magic (technology) to prevail. The tale ends in heaping treasure chests for all, borne home on the unicorn's back.

At pitch meetings, Andreessen is relatively measured: he reserves his passion for the deal review afterward, when the firm decides whether to invest. That's where he asks questions that oblige his partners to envision a new world. For the ride-sharing service Lyft: "Don't think about how big the taxi market is. What if people no longer owned cars?" For OfferUp: "What if all this selling online—eBay and Craigslist—goes to mobile? How big could it be?" Ben Horowitz, who sits next to his co-founder at the head of the table, is an astute manager who quotes the rap lyrics of his friends Nas and Kanye West to inspire fearless thinking—but he doesn't try to manage Andreessen. "If you say to Marc, 'Don't bite somebody's fucking head off!,' that would be wrong," Horowitz said. "Because a lot of his value, when you're making giant decisions for huge amounts of money, is saying, 'Why aren't you fucking considering *this* and *this* and *this*?'"

A16z was designed to be a full-throated argument about the future, a design predicated on its founders' comfort with conflict. In 1996, when Horowitz was a Netscape product manager, he wrote a note to Andreessen, accusing him of prematurely revealing the company's new strategy to a reporter. Andreessen wrote back to say that it would be Horowitz's fault if the company failed: "Next time do the fucking interview yourself. Fuck you." Ordinarily, relationship over. "When he feels disrespected, Marc can cut you out of his life like a cancer," one of Andreessen's close friends said. "But Ben and Marc fight like cats and dogs, then forget about it." Two years later, when Netscape was floundering and forty per cent of its employees left, Horowitz announced that he was staying no matter what. Andreessen had never trusted anyone before, but he began to consider it. Their teamwork at a16z is complementary: Horowitz is the people-person C.E.O., and Andreessen is the farsighted theorist, the chairman. Yet Horowitz noted that "Marc is much more sensitive than I am, actually. He'll get upset about my *body language*—'God damn it, Ben, you look like you're going to throw up when I'm talking about this!'"

Although Andreessen has been a board member of Facebook, Hewlett-Packard, and eBay, he doesn't take many board seats in a16z's portfolio companies, preferring to train his eyes on the horizon. Andreessen is tomorrow's advance man, routinely laying out "what will happen in the next ten, twenty, thirty years," as if he were glancing at his Google calendar. He views his acuity as a matter of careful observation and extrapolation, and often invokes William Gibson's observation "The future is already here—it's just not very evenly distributed." Jet packs have been around for half a century, but you still can't buy them at Target. To smooth out such lumps in distribution, Andreessen disseminates his views via every available podcast and panel discussion and CNN interview slot: he's a media soothsayer, Andreessen the Magnificent. He also tweets a hundred and ten times a day, inundating his three hundred and ten thousand followers with aphorisms and statistics and tweetstorm jeremiads. Andreessen says that he loves Twitter because "reporters are obsessed with it. It's like a tube and I have loudspeakers installed in every reporting cubicle around the world." He believes that if you say it often enough and insistently enough it will come—a glorious revenge. He told me, "We have this theory of nerd nation, of forty or fifty million people all over the world who believe that other nerds have more in common with them than the people in their own country. So you get to choose what tribe or band or group you're a part of." The nation-states of Twitter will map the world.

Mixpanel was emblematic of Silicon Valley's outsized worship of unicorns. At the company's deal review, Peter Levine, who sits on Doshi's board, reported that the entrepreneur had e-mailed to say that he'd love for his company to be valued at a billion dollars—an assessment that would set the price for the portion of it that a16z might now buy. However, Doshi would sell the firm ten per cent of his company for eighty million, suggesting a valuation of eight hundred million

dollars. Andreessen said, "The dogs are fucking jumping through the screen door to eat the dog food. And he hasn't done any marketing yet. And he's profitable!"

Horowitz exclaimed, "How old is he, twenty-four? God damn it, let's give him all our money!" A16z provided Doshi all his B-round funding—sixty-five million dollars—for a further 7.5 per cent of the company, which was thus valued at eight hundred and sixty-five million dollars. Doshi was a little sorry that Mixpanel wasn't valued at a billion dollars, but he told me that he could wait: his business was growing so fast, and everyone was raising money so frequently in the current boom, that "in six or twelve months we'll be a unicorn."

Venture firms rarely do an entire follow-on round themselves, for fear of losing sight of a company's true market value; as Andreessen put it, "You can be thinking your shit smells like ice cream." None of the half-dozen other firms that Doshi pitched last fall valued his company as highly as a16z did. But Andreessen applied a maxim from his friend and intellectual sparring partner Peter Thiel, who co-founded PayPal and was an early investor in LinkedIn and Yelp. When a reputable venture firm leads two consecutive rounds of investment in a company, Andreessen told me, Thiel believes that that is "a screaming buy signal, and the bigger the markup on the last round the more *undervalued* the company is." Thiel's point, which takes a moment to digest, is that, when a company grows extremely rapidly, even its bullish V.C.s, having recently set a relatively low value on the previous round, will be slightly stuck in the past. The faster the growth, the farther behind they'll be. Andreessen grinned, appreciating the paradox: the more they paid for Mixpanel—according to Thiel, anyway—the better a deal they'd be getting.

Most businesses don't work like this. At least, not yet.

Silicon Valley, the fifteen-hundred-square-mile shelf an hour south of San Francisco, was called the Santa Clara Valley until the rise of the microprocessor, in the nineteen-seventies. It remains contested ground. Armies of startups attack every incumbent, with early employees—and sometimes even their lawyers and landlords—taking deferred compensation, in the hope that their options and warrants will pay off down the line. Yet workers' loyalty is not to a company or even to an idea but to the iterative promise of the region. "Uber is built on the efforts of thousands of people in the Valley," the investor Naval Ravikant said. "On the back of the iPhone and Android and G.P.S. and battery technology and online credit-card payments, all stacked on themselves."

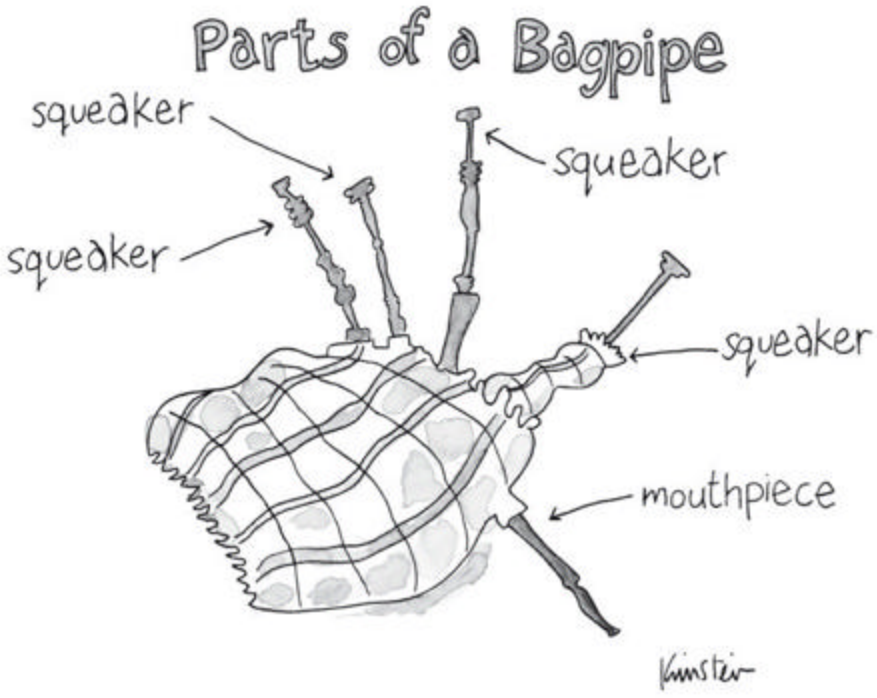
V.C.s give the Valley its continuity—and its ammunition. They are the arms merchants who can turn your crazy idea and your expendable youth into a team of coders with Thunderbolt monitors. Apple and Microsoft got started with venture money; so did Starbucks, the Home Depot, Whole Foods Market, and JetBlue. V.C.s made their key introductions and stole from every page of Sun Tzu to help them penetrate markets. And yet V.C.s maintain a zone of embarrassed privacy around their activities. They tell strangers they're investors, or work in technology, because, in a Valley that valorizes the entrepreneur, they don't want to be seen as just the money. "I say I'm in the software industry," one of the Valley's best-known V.C.s told me. "I'm ashamed of the truth."

At a hundred and eleven dollars a square foot, Sand Hill Road is America's most expensive office-rental market—an oak-and-eucalyptus-lined prospect stippled with bland, two-story ski chalets constrained by an ethos of nonconspicuous consumption (except for the Teslas in the parking lot). It's a community of paranoid optimists. The top firms coöperate and compete by turns, suspicious of any company whose previous round wasn't led by another top-five firm even as they're jealous of that firm for leading it. They call this Schadenfreude-riddled relationship "co-opitition." Firms trumpet their boldness, yet they often follow one another, lemming-like, pursuing the latest innovation—pen-based computers, biotech, interactive television, superconductors, clean tech—off a cliff.

Venture capital became a profession here when an investor named Arthur Rock bankrolled Intel, in 1968. Intel's co-founder Gordon Moore coined the phrase "vulture capital," because V.C.s could pick you clean. Semiretired



"In New York, we wouldn't call this quick."



millionaires who routinely arrived late for pitch meetings, they'd take half your company and replace you with a C.E.O. of their choosing—if you were lucky. But V.C.s can also anoint you. The imprimatur of a top firm's investment is so powerful that entrepreneurs routinely accept a twenty-five per cent lower valuation to get it. Patrick Collison, a co-founder of the online-payment company Stripe, says that landing Sequoia, Peter Thiel, and a16z as seed investors "was a signal that was not lost on the banks we wanted to work with." Laughing, he noted that the valuation in the next round of funding—"for a pre-launch company from very untested entrepreneurs who had very few customers"—was a hundred million dollars. Stewart Butterfield, a co-founder of the office-messaging app Slack, told me, "It's hard to overestimate how much the perception of the quality of the V.C. firm you're with matters—the signal it sends to other V.C.s, to potential employees, to customers, to the tech press. It's like where you went to college."

A venture firm musters its ammunition—say, a fund of a hundred and fifty million dollars—by recruiting investors such as university endowments and pension funds to become "limited partners," or L.P.s, in the fund. The firm invests the money for three or four years, then harvests the returns for the remainder of the fund's ten-year term. In theory, V.C.s, like entrepreneurs, are motivated by delayed gratification. The standard fee is "two and twenty": two per cent of the fund each year, and twenty per cent of the ultimate profits. (The top firms, including a16z, charge thirty per cent.) L.P.s expect returns equal to at least those they'd get in the stock market, plus an additional five per cent for the illiquidity of the investment. For top firms, the dream is 5x to 10x.

At the moment, venture funding accounts for less than 0.3 per cent of the U.S.'s G.D.P. "Venture is often called a rounding error in the economy," Herbert Allen III, the head of the investment bank Allen & Company, said. "But the bang for the buck is huge. And venture is a major source of the optimism that underlies the American myth." Venture speeds the cycle of American impatience: what exists is bad and what replaces it is good—until the new thing itself must be supplanted.

Corporate culture, civic responsibility, becoming a pillar of society—these are not venture's concerns. Andy Weissman, a partner at New York's Union Square Ventures, noted that venture in the Valley is a perfect embodiment of the capitalist dynamic that the economist Joseph Schumpeter called "creative destruction." Weissman said, "Silicon Valley V.C.s are all techno-optimists. They have the arrogant belief that you can take a geography and remove all obstructions and have nothing but a free flow of capital and ideas, and that it's good, it's very good, to creatively destroy everything that has gone before." Some Silicon Valley V.C.s believe that these values would have greater sway if their community left America behind: Andreessen's nerd nation with a charter and a geographic locale. Peter Thiel favors "seasteading," establishing floating cities in the middle of the ocean. Balaji Srinivasan, until recently a general partner at a16z and now the chairman of one of its Bitcoin companies, has called for the "ultimate exit." Arguing that the United States is as fossilized as Microsoft, and that the Valley has become stronger than Boston, New York, Los Angeles, and Washington, D.C., combined, Srinivasan believes that its denizens should "build an opt-in society, ultimately outside the U.S., run by technology."

The game in Silicon Valley, while it remains part of California, is not ferocious intelligence or a contrarian investment thesis: everyone has that. It's not even wealth: anyone can become a billionaire just by rooming with Mark Zuckerberg. It's prescience. And then it's removing every obstacle to the ferocious clarity of your vision: incumbents, regulations, folkways, people. Can you not just see the future but summon it?

Marc Andreessen mentions Thomas Edison often, his family never. When he was growing up, outside the no-stoplight town of New Lisbon, Wisconsin, his father, Lowell, was a sales manager for a seed company called Pioneer Hi-Bred International, and his mother, Pat, worked in customer service at Lands' End—but I didn't get that information from him. A friend who knows Andreessen well told me, "We've never had a conversation about his parents or his brother—all he said was 'They didn't like me, and I didn't like them all that much, either.'"

The few details Andreessen let slip to me suggested a climate of antiquity, superstition, frustration, and penury. "The natural state of human beings is to be subsistence farmers, and that was my expectation," he said, adding that his world was "Scandinavian, hard-core, very

self-denying people who go through life never expecting to be happy." The family telephone was a party line, and the bathroom at his relatives' farm was an outhouse. Everyone believed in dowsing and the weather reports in the *Farmers' Almanac*. One winter, with money tight, his father decided to stop paying for gas heat, "and we spent a great deal of time chopping fucking wood." The local movie theatre, one town over, was an unheated room that doubled as a fertilizer-storage depot; Andreessen wore a puffy Pioneer Hi-Bred coat to watch "Star Wars" while sitting on the makings of a huge bomb. He had to drive an hour to find a Waldenbooks, in La Crosse; it was all cookbooks and cat calendars. So he later saw Amazon as a heroic disseminator of knowledge and progress. "Screw the independent bookstores," he told me. "There weren't any near where I grew up. There were only ones in college towns. The rest of us could go pound sand."

Andreessen's vision of the future, and of his escape route, came from television. He told me, "KITT, the car in 'Knight Rider,' was a computer that could analyze a poison-gas attack. The car was magic—but now you can actually do all those things. A new car isn't KITT, but it does have all the maps and all the music in the world, and it talks to you. Even the transporter beam in 'Star Trek' basically makes sense if you understand quantum entanglement. People are composed of quantum elements, so there is a path!"

Something of the transporter beam clings to Andreessen, a sense that he just rematerialized from a city on the edge of forever. He's not great at the basics of daily life: directions confound him, because roadways aren't logical, and he's so absent-minded about sunglasses that he keeps a "reload station" with nine pairs on his hall table. Perhaps Edison haunts his conversation because Andreessen is a fellow-tinkerer, except that his gadgets are systems and platforms, and his workshop is his own mind. He regularly reprograms his appearance and deportment—his user interface—to suit his present role, and friends refer to chapters in his life as versions of an operating system: "Marc 1.0," "Marc 2.0," and so on. A charismatic introvert, Andreessen draws people in but doesn't really want them around. Though he has a crisp sense of humor, it's rarely deployed at his own expense. He hates being complimented, looked at, or embraced, and has toyed with the idea of wearing a T-shirt that says "No hugging, no touching." He doesn't grasp the protocols of social chitchat, and prefers getting a memo to which he can e-mail a response, typing at a hundred and forty words a minute. He didn't attend Netscape's twentieth-anniversary celebration, because it combined two things from which he recoils: parties and reminiscing.

Yet he's also energetic and decisive, which makes him a valued counsellor. In 2006, Yahoo! offered to buy Facebook for a billion dollars, and Accel Partners, Facebook's lead investor, urged Mark Zuckerberg to accept. Andreessen said, "Every single person involved in Facebook wanted Mark to take the Yahoo! offer. The psychological pressure they put on this twenty-two-year-old was intense. Mark and I really bonded in that period, because I told him, 'Don't sell, don't sell, don't sell!'" Zuckerberg told me, "Marc has this really deep belief that when companies are executing well on their vision they can have a much bigger effect on the world than people think, not just as a business but as a steward of humanity—if they have the time to execute." He didn't sell; Facebook is now worth two hundred and eighteen billion dollars.

Andreessen's range of reference extends from Ibn Khaldun to "South Park," yet he approaches new topics as if starved, eating through men's fashion or whiskey-making or congressional politics until it has yielded every micronutrient. In a tweetstorm about the question of net neutrality, he observed that anyone who took a position should be versed in the "history, technology, and economics of backbones, interconnection agreement, peering, CDNs, caching, colocation, current and future telco and cable business models including capex and opex models, rate caps, cost of capital, return on investment," as well as a dozen other equally abstruse matters. He coyly noted that no one, himself included, understood them all—then stated his position. Andreessen's learning fuses the idiosyncrasy of the autodidact with the thoroughness of what programmers call depth-first search. "I could never tolerate not knowing why," he said. "You have to work your way back to figure out the politics, the motivations. I always stop when I get to evolutionary psychology, and why we have tribes—oh, O.K., we're primates cursed with emotions and the ability to do logical thinking." He keeps rediscovering that we're australopithecines, and keeps hoping to transform us into *Homo habilis:* man the tool user, able man.



To this end, he addresses any topic, such as Google's purchase of the thermostat maker Nest, by launching a dialectics—"1) Either Nest is the most amazing company ever, or 2) Larry Page acqui-hired Tony Fadell for $3.2 billion and got a thermostat business on the side"—whose synthesis is often that the thesis and the antithesis were simplistic ("Or, maybe Google has a larger plan for automating the home") or irrelevant ("Whatever, whatever, we don't own it, so who cares?"). Often, he discourses at such lucid length that his cheeks redden and he must pause for breath. If you seize the interval to demonstrate a basic grasp of his argument, he'll say "Ex-zact-ly," with a pleased smile, and upload another tranche. What saves him from pompous know-it-all-dom, most of the time, is this eagerness to communicate.

He turns to theory the way a drinker turns to the minibar. But Horowitz told me that every once in a while Andreessen will "get all Wisconsin on you, sticking up for his people. When we looked at an Internet pawnshop, people here said, 'It's immoral,' and Marc went bananas. He said, 'If you've got no fucking money, and you need to pawn your watch to pay for your kids to eat—you think that's morally fucking wrong because it offends your sensibilities, you rich motherfuckers?' He knew that guy who was pawning his watch because he'd missed the harvest, or whatever. Or we saw an Uber-for-private-jets thing, or some wine thing that came through, and he just got incensed: 'We didn't start the firm for rich people to buy hundred-dollar bottles of wine or to fly around on fucking private

jets!' He reminds me of Kanye, that level of emotional intensity—his childhood was so intensely bad he just won't go there."

One afternoon, Alexis Ringwald, the C.E.O. of LearnUp, a job-training startup that has worked with Staples and Old Navy, stood in a16z's conference room, all poise and smile. "I like to launch movements to tackle huge problems," she said, launching into her presentation.

"Start at the beginning, where you grew up," Ben Horowitz said. A16z had made a small seed investment in Ringwald's company, but most of the general partners, who were about to tell her whether she was ready for an A round, didn't know much about her. Horowitz also routinely forces a founder to abandon her script and regroup. It's a stress test intended to elicit biography, resilience, and the real story.

Ringwald, who is thirty-one, blinked, then shifted smoothly to an engaging account of her early years, her work interviewing people on the unemployment line, and how she'd eventually realized that the country's biggest gulf is between those who have the basic skills to be employable—showing up on time, dressing neatly—and those who don't. "So it's a modern 'My Fair Lady' sort of thing?" Horowitz asked, ingenuously. Ringwald crisply noted that her process triples an applicant's chance of getting a job, and that eighty-two per cent of LearnUp's trainees outperform their fellow-workers. Horowitz and Andreessen nodded: she could handle the pressure. Afterward, Horowitz told me, "My big conclusion was she's a legit Pied Piper, with charisma and will and fury."

Pitch meetings are minefields. If a V.C. asks you, "When you get to a hundred engineers, are you worried about the company culture or excited?," the correct answer is "A hundred? I want a thousand!" Reid Hoffman, a V.C. at Greylock Partners who co-founded LinkedIn, told me, "I look to see if someone has a marine strategy, for taking the beach; an army strategy, for taking the country; and a police strategy, for governing the country afterward."

A16z wants to learn if the founder has a secret—a novel insight, drawn from personal experience, about how the world could be better arranged. If that new arrangement is 10x better, consumers might be won over. Balaji Srinivasan contributed the concept of the "idea maze": you want the entrepreneur to have spent years thinking her idea into—and out of—every conceivable dead end. "Entrepreneurs want to raise money from us," Andreessen told me, "so the natural thing when we say 'What if you did *this*?' is to tell us what we want to hear. But we don't want to hear what we want to hear. It's a delight when they look at you with contempt—*You idiot*—and then walk you through the idea maze and explain why your idea won't work." Such tests help a16z determine whether the founder is a mercenary who wants to sell the company within four years, which will cap a16z's return at 5x, or a missionary, determined to change the world. "At the same time," Andreessen said, "we're not funding Mother Teresa. We're funding imperial, will-to-power people who want to crush their competition. Companies can only have a big impact on the world if they get big."

Ringwald, back into her planned remarks, promised bigness: "LearnUp will transform employment in America. We can unleash human potential and move the needle on the G.D.P." Andreessen said, "Question: This is a known problem. Why do companies not just do this themselves, once they see that it works?" Ringwald replied, "We'll keep on differentiating by moving fast and collecting more data on what companies need now."

Then a general partner named Chris Dixon asked, "Is it a marketplace or an enterprise company?" Marketplace companies sell to consumers; enterprise companies sell to other businesses. Clearly perplexed by the distinction, Ringwald said that she was signing up workers as well as companies. Everyone became a shade more remote.

Afterward, Andreessen told his colleagues, "She didn't really answer Chris's question. If it's marketplace, it's defensible; if it's enterprise, she can be undercut." If Ringwald's customers were the workers, who would keep using LearnUp as they moved from job to job, she could create a network effect. If her customers were actually the companies, they could start doing the training themselves—or another startup could. A16z views marketplace and enterprise companies very differently. The firm invests early with enterprise, but waits with consumer companies, because they tend to take off—suddenly, everyone wants to be on Instagram—or fail fast. It's a risk-averse way to embrace risk. In 2013, a16z passed on the A round of Oculus VR (waiting to see if it could resolve the nausea issue that has plagued virtual-reality systems) and came in on the B, six months later. It got the same ten per cent of the company it could have had in the A—but it paid thirty million dollars instead of six million. The internal rationale for this expensive "derisking" is "We paid up for certainty."

The partners began to discuss how LearnUp might be valued. Valuation, particularly in a company's early rounds, often derives less from spreadsheets than from market forces—what are other firms offering?—and the "What if"s of mental modelling. Does the company's traction, leadership team, and "total addressable market" call to mind a Pinterest, or does it feel more like a ShoeDazzle? One partner suggested that LearnUp was a "ten on thirty"—ten million dollars should buy a third of the company, which would then be valued at forty million. "It's more like ten on fifteen or twenty," Horowitz said, cutting the company's value in half. "Or six on twelve," Andreessen said, whittling it further. Soon after the meeting, Ringwald turned LearnUp into an enterprise company.

Most venture firms operate as a guild; each partner works with his own companies, and a small shared staff helps with business development and recruiting. A16z introduced a new model: the venture company. Its general partners make about three hundred thousand dollars a year, far less than the industry standard of at least a million dollars, and the savings pays for sixty-five specialists in executive talent, tech talent, market development, corporate development, and marketing. A16z maintains a network of twenty thousand contacts and brings two thousand established companies a year to its executive briefing center to meet its startups (which has produced a pipeline of deals worth three billion dollars). Andreessen told me, "We give our founders the networking

superpower, hyper-accelerating someone into a fully functional C.E.O. in five years."

The firm's fourteen-person deal team also enables it to rapidly assess any new technology, making a16z a kind of Iron Man suit for Andreessen as he pursues his flights of fancy. Jim Breyer, who led Facebook's first venture round at Accel Partners, told me, "I spend most of my time trying to connect the dots for what the future will look like in five to seven years, but I don't believe I scale as well as Marc and Ben and their team. They've moved into next-gen agricultural products and wearables and drone software, where a lot of us don't have expertise or networks."

Andreessen and Horowitz launched the firm in 2009, when venture investment was frozen by the recession. Their strategy was shaped by their friend Andy Rachleff, a former V.C. He told them that he'd run the numbers and that fifteen technology companies a year reach a hundred million dollars in annual revenue—and they account for ninety-eight per cent of the market capitalization of companies that go public. So a16z had to get those fifteen companies to pitch them. "Deal flow is everything," Andreessen told me. "If you're in a second-tier firm, you never get a chance at that great company." A leading investment banker who has taken numerous software companies public told me, "I put ninety per cent of my effort into seeking out deals from the top eight venture firms, ten per cent into the next twelve, and zero per cent into all the rest."

The dirty secret of the trade is that the bottom three-quarters of venture firms didn't beat the Nasdaq for the past five years. In a stinging 2012 report, the L.P. Diane Mulcahy calculated, "Since 1997, less cash has been returned to V.C. investors than they have invested." The truth is that most V.C.s subsist entirely on fees, which they compound by raising a new fund every three years. Returns are kept hidden by nondisclosure agreements, and so V.C.s routinely overstate them, both to encourage investment and to attract entrepreneurs. "You can't find a venture fund anywhere that's not in the top quartile," one L.P. said sardonically. V.C.s also logo shop, buying into late rounds of hot companies at high prices so they can list them on their portfolio page.



"How many times do I have to tell you to stay inside the bowl?"

• •

When a16z began, it didn't have even an ersatz track record to promote. So Andreessen and Horowitz consulted on tactics with their friend Michael Ovitz, who co-founded the Hollywood talent agency Creative Artists Agency, in 1974. Ovitz told me that he'd advised them to distinguish themselves by treating the entrepreneur as a client: "Take the long view of your platform, rather than a transactional one. Call everyone a partner, offer services the others don't, and help people who aren't your clients. Disrupt to differentiate by becoming a dream-execution machine."

Believing that founders make the best C.E.O.s—look at Intel, Apple, Oracle, Google, Facebook—Andreessen and Horowitz recruited only general partners who'd been founders or run companies. Then they began constructing the illusion of authority, taking offices on Sand Hill Road and filling them with paintings by Robert Rauschenberg and Sol LeWitt—another page from the book of Ovitz, who commissioned a Roy Lichtenstein painting for C.A.A.'s lobby that was so large the firm had to leave it behind when it moved. They were studiously punctual (partners are fined ten dollars for each minute they're late to a pitch), used glassware rather than plastic, and said no quickly and explained why (unless the reason was doubts about the entrepreneur) in a handwritten note. And, while most V.C.s were publicity averse—Sequoia's slogan was "The entrepreneurs behind the entrepreneurs"—a16z banged the drum to draw startups. The tech publicist Margit

Wennmachers built an eight-person marketing department and helped to orchestrate stories in *Forbes* and *Fortune*.

Andreessen and Horowitz believed that it would take them years to get great deal flow. So instead of fighting for A-round financings—the most competitive round, because it's when you can buy the largest chunk of an up-and-coming company—they planned to make seed investments in eighty start-ups. They wouldn't take the customary board seats (otherwise, they'd each be sitting on forty boards), but they'd help all eighty companies and then lead the A round for the twelve best.

The strategy had flaws. Entrepreneurs want V.C.s on their boards, and so do L.P.s: that's how you really learn a company. The firm would be sending a huge negative signal about companies it didn't reinvest in—hardly an entrepreneur-friendly stance. Furthermore, by making so many investments, a16z would create significant opportunity costs. In its first year, it put two hundred and fifty thousand dollars into a company called Burbn, which soon pivoted and became Instagram—but a16z couldn't increase its share, because it had also taken a position in a short-lived photo app called PicPlz. Though the firm made 312x when Facebook bought Instagram, the huge multiple amounted to only seventy-eight million dollars. Elizabeth Obershaw, a managing director at Horsley Bridge, a prominent L.P. that invested in a16z after some debate, told me, "Our list of cons was that we didn't think their original model would work at all. The pros were Marc and Ben—we decided they were learners and adapters and would realize the model wasn't workable fast enough to fix it—and an industry that was ripe for reinvention."



They learned fast. After a16z raised a three-hundred-million-dollar fund and opened shop, in July, 2009, it did a lot of seed rounds, but it also spent fifty million dollars to buy three per cent of Skype. Two years later, Microsoft bought Skype, and the investment returned 4x. Andreessen believed that everyone had underestimated the size of the Internet market, so in 2010, after raising a much bigger second fund, the firm spent a hundred and thirty million dollars to acquire shares of Facebook and Twitter at unprecedented valuations. Other V.C.s sniped that a16z was trying to buy its way in: Skype was an established company, not a startup, and the Facebook and Twitter deals were mere logo shopping. But, as Ron Conway, Silicon Valley's leading angel investor, noted, "In twenty-four months, Andreessen Horowitz was the talk of the town." The firm won a hundred-million-dollar A round for the coding company GitHub, which Conway called "the most hotly contested deal in five years." Chris Wanstrath, GitHub's co-founder and C.E.O., said that a16z's services were a major attraction: "It's like a buffet—they offered a bunch of great dishes, and we wanted to sample them all."

After six years, Andreessen believes, a16z is meeting—and winning—enough new clients to place it "comfortably in the top three" V.C. firms. (This is not far off from the consensus in the Valley.) Its first fund has already returned 2x, and contains such powerhouses as Slack and the identity-management company Okta. The fund's internal rate of return, a calculation of annualized profit, is fifty per cent, which places it very high among funds raised in 2009. (Sequoia's rate for its corresponding fund is sixty-nine per cent.) The firm's second fund includes Pinterest and Airbnb, and its third fund includes Zenefits, GitHub, and Mixpanel; both funds, on paper, are well into the black. A respected L.P. of the firm told me, "They're one of our top performers." Yet Andreessen cautioned, "We still have a lot to prove on returns. I wouldn't be comfortable saying we're No. 1 until ten years have passed, maybe fifteen. Until then, it's Schrödinger's cat, and I've got really good arguments on why the cats are both alive and dead."

At Andreessen's wedding, in 2006, Ben Horowitz said in his toast that the man he'd long known was "grouchy Marc," because he'd "gone through his whole life without anyone understanding him, being all by himself." No one had understood him in his farm town, no one had understood him in Silicon Valley—"Hell, I do not understand him." But now, at last, he was "happy Marc," because he'd found "someone who totally gets him": the bride, a lecturer in

VIEW FROM A FOLDING CHAIR

Never decorative, it embodies a chair's provisional character.

Utilitarian, never just there, called upon to serve.

Communal, egalitarian, levelling its occupants, gathered for
an occasion.

Rarely will it hold the sitters captive. Its precariousness invites
walkouts, even when secured by an admittance fee.

Repositionable, it favors assorted geometries of attention: the frontal
and single-focussed, the shifting and radial.

Irreverent, whether in an institutional setting or not, signalling
reversible orders.

Possibly carnivalesque, displaying an upside-down world, as in:

a projection of the high-desert landscape and transit
surrounding an old ice plant in Marfa
requiring no other technology but a lens and a dark room;

ironically inverted in this picture of a tiny fraction of the planet—
with no Google logo and copyright date camouflaged to appear like a wisp of a stratus cloud—
is the electrical plant across the street
grids reversed, as is the soundtrack extemporaneously produced
by the cars and pickup trucks seen fleeting by from east to west
though by the sound we know they're going west to east, and vice versa;

a projection within a projection

these are moving images to experience, but not keep.

Unsung, stacked, piled against a wall, or hidden in closets, folding chairs will be counted on again since, plastic palace people, they're both transience and ritual.

Welcome into the fold. Who cares what the future brings.

—*Mónica de la Torre*

philanthropy at Stanford's business school named Laura Arrillaga-Andreessen.

In December, Andreessen invited me to their house in Atherton, five minutes from a16z's office, to watch television. He and Laura live in a modern, art-filled, nine-thousand-square-foot villa built in a style that she calls "Northern California pastiche." The ceilings are scaled to Andreessen's Brobdingnagian proportions, and everything is majestic, minimal, and new. The toilet in the powder room is so visionary, and the surrounding dimmer lights so flattering, that I had to study it for some time to figure out how it flushed.

Arrillaga-Andreessen brought the couple's dinners into the living room and placed them on matching Costco TV tables. The omelettes and Thai salads that their chef had prepared earlier had been freshly reheated (they have three microwaves, so their food will always be ready at the same time). Andreessen stroked her arm and beamed: "Hello, gorgeous!"

"Hello, my darling!" she replied. Then she gave me a dramatic hug, as we hadn't seen each other since the previous day. Arrillaga-Andreessen is a tall, ethereal-seeming, yet effusive woman. When the couple met, in 2005, at a New Year's Eve dinner thrown by the leading investor in eHarmony, they talked for six and a half hours. She told me that Andreessen satisfied most of the criteria on her checklist: he was a genius, he was a coder, he was funny, and he was bald. ("I find it incredibly sexy to see the encasement of a cerebrum," she explained.) For his part, Andreessen felt that "she was spectacular! My biggest concern was that she wanted to live a jet-set life." In one of the seventeen e-mails he sent her the next day, he asked, "What's your ideal evening?" She responded, "Stay home, do e-mail, make an omelette, watch TV, take a bath, go to bed." Before their second date, he delivered what she calls "a twenty-five-minute monologue on why we should go steady, with a full intellectual decision tree in anticipation of my own decision tree." They were married nine months later. In her and her father, John, a billionaire Silicon Valley developer, Andreessen seems to have found a replacement family. Laura showed me a photograph of the two men side by side, both bald, self-made, and magisterial: "Quite two peas in a pod."

After some TV time together, the couple reads in bed, so that, she says, "I can fall asleep holding my beloved." (She invariably refers to her husband as "my beloved," rather than "Marc.") "I ask him questions about things I got curious about during the day, so every night I'm going to sleep with a human Wikipedia that can go deeper and deeper and deeper, link upon link. In the past week, we talked about all the hardware components of a mobile phone, how binary code works, what might happen with drone regulation, and whether Putin is using Ukraine as a distraction from the financial crisis in Russia." Once she's dozed off, Andreessen returns to work in his home office, where, like a recharging cell phone, he gains energy through the night.

He pushed a button to unroll the wall screen, then called up Apple TV. We were going to watch the final two episodes of the first season of the AMC drama "Halt and Catch Fire," about a fictional company called Cardiff, which enters the personal-computer wars of the early eighties. The show's resonance for Andreessen was plain. In 1983, he said, "I was twelve, and I didn't know anything about startups or venture capital, but I knew all the products." He used the school library's Radio Shack TRS-80 to build a calculator for math homework. In 1992, as an undergraduate at the University of Illinois at Urbana-Champaign, he neglected his job—writing Unix code for $6.85 an hour—to team with another programmer to create Mosaic, the first graphical browser for the Web. After graduating, he moved to Silicon Valley, where he and a volatile serial entrepreneur named Jim Clark launched Netscape, to make the Internet available not just to scientists but to everyone. John Doerr, the V.C. who funded their A round, said that the genius of their browser was that "it was like putting photos on the menu at Howard Johnson. You didn't need to know the language; you could just point." The story underlying that story, Arrillaga-Andreessen told me—the secret—was that "Netscape was based on my beloved's own inability, as a child, to access knowledge in a small town."

Netscape Navigator, released in 1994, quickly claimed more than ninety per cent of the browser market, and Andreessen predicted that the Web would make operating systems such as Microsoft's Windows "irrelevant." When the company went public, in 1995, its stock rocketed from twenty-eight dollars a share to seventy-five dollars, and Andreessen was soon on the cover of *Time*,

barefoot on a throne. But Marc 1.0 was very much in beta. Having given up coding, his first love, to manage coders, he scarfed Pepperidge Farm Nantuckets and Honeycomb cereal straight from the box, skipped meetings, and blazed up without warning. "You'd see him vibrating, and it would inspire a combination of excitement and terror," Jason Rosenthal, a manager whom Andreessen actually liked, recalled. A favorite Andreessen response to underlings' confusion was "There are no stupid questions, only stupid people." Jim Barksdale, the company's C.E.O., said, "I'd tell Marc after meetings, 'You don't have to *tell* a dumb sumbitch he's a dumb sumbitch.'" Andreessen told me, "I needed Netscape to work, it had to work—it was my one-way door—so I was absolutely intolerant of anything that got in the way"—meaning, he clarified, "people." He could never relax: "I am very paranoid. And the down cycle hurt a lot more than the up cycle felt good."

The down cycle began when Microsoft bundled its own browser with its operating system, making it the nation's browser of convenience, if not of choice. Netscape shifted from marketplace to enterprise, and began selling browser and server software, but it was fortunate to get bought by AOL, in 1999, for ten billion dollars. Peter Currie, the company's C.F.O., said, "We made a difference, we invented cookies and pioneered downloading software from the Internet, yet Netscape is an asterisk in business history. Maybe the best way to think about it is as a classic tech story: a company creates, invents, succeeds—and gets bypassed."

In the first "Halt and Catch Fire" episode, Cardiff's entrepreneurs go to Comdex, the big trade show, and discover that another company has stolen their idea and beaten them to market. In response, Gordon, the hardware engineer, removes the interactive operating system from their Cardiff machine—a system designed by Cameron, a punk female software prodigy—and slots in Microsoft's DOS, which makes the machine I.B.M.-compatible, viable, and dull. It was an excruciating capitulation, but Andreessen nodded evenly: "This was Microsoft's moment, and Gordon is right—they need to live to fight another day. But . . ." He pointed at the screen, where Apple's Macintosh was making its début at the trade show. "Hello, I'm Macintosh," the machine said. Andreessen laughed and continued, "They were doomed from the start, because Apple in Cupertino"—in Silicon Valley—"had spent three years building *that*. I've been totally determined to be on the other side of that dynamic by being here, because success in software follows a power-law distribution. It's not Coke and Pepsi and a bunch of others; it's winner take all. Second prize is a set of steak knives, and third prize is you're fired."

In the season finale, Cameron launches her own startup. As Andreessen watched her manage her coders, he said, softly, "The best scenes with Cameron were when she was alone in the basement, coding." I said I felt that she was the least satisfactory character: underwritten, inconsistent, lacking in plausible motivation. He smiled and replied, "Because she's the future."

In "Why Software Is Eating the World," a widely invoked 2011 op-ed in the *Wall Street Journal*, Andreessen put the most optimistic spin on Silicon Valley's tendencies. The article proclaimed that tech companies are consuming vast swaths of the economy, from books and movies to financial services to agriculture to national defense—which Andreessen saw as the healthful scavenging of a carrion way of life. On Twitter, he pursued the theme: "Posit a world in which all material needs are provided free, by robots and material synthesizers. . . . Imagine six, or 10, billion people doing nothing but arts and sciences, culture and exploring and learning. What a world that would be," particularly as "technological progress is precisely what makes a strong, rigorous social safety net affordable."

Andreessen's telepathic method—extrapolating the future from current trends—may be the best available, but it has had doubtful results. Of the eighteen firms that V.C.s valued at more than a billion dollars in the heady days of 1999-2000, eleven have gone out of business or have been liquidated in fire sales, including @Home, eToys, and Webvan. A16z bought into Zulily, an online marketer, at a valuation of a billion dollars; it soared to a market capitalization of five billion dollars, and has since slumped to $1.3 billion. Another billion-dollar a16z company, the bargain-shopping site Fab, recently sold for about thirty million dollars. On the other hand, the firm wrote off the gaming company Slack to zero—and then it became an office-messaging app that's now valued at $2.8 billion.

The random, contingent way that the future comes to pass is a source of endless frustration in the Valley. Sam Altman, the president of the startup incubator Y Combinator, notes that his early investment in Stripe is now worth, on paper, more than 2,000x. "So ninety-seven per cent of my returns from 2010 and 2011 are concentrated in one investment, which I could easily have missed," he said. "I only let myself think about this sort of thing on vacation, because if I acknowledged that I was wasting more than ninety per cent of my time—which is true, from an economic perspective—I couldn't get through my days."

The key to investing, Andreessen contends, is to be aggressive and to fight your instinct to pattern-match. "Breakthrough ideas look crazy, nuts," he said, adding, "It's hard to think this way—I see it in other people's body language, and I can feel it in my own, where I sometimes feel like I don't even care if it's going to work, I can't take more change." Andreessen believes that the major barrier to change is sociological: people can embrace only so many new ideas at once. "O.K., Google, O.K., Twitter—but Airbnb? People staying in each other's houses without there being a lot of axe murders?"

A16z passed on Airbnb's A round in 2009. Reid Hoffman, the Greylock V.C., who led that round, and who is a friend of Andreessen's, said, "Once something like Airbnb gets going, Marc can get a very good sense of it, of the economic system—but he's not necessarily as good at the psychology of why it would get going in the first place."

Brian Chesky, Airbnb's co-founder and C.E.O., told me, "In 2011, when we were starting to get some traction, Marc and Ben did a one-eighty and were very humble. Marc said he now saw it through the lens of eBay: buying stuff from strangers." A16z led Airbnb's B round. Soon afterward, the company was battered by headlines about renters who trashed a San Francisco home. It wasn't axe murders, but, Chesky said, "It was a

P.R. nightmare. We had just expanded from being ten people living in a three-bedroom apartment and we had no idea how to be a billion-dollar company. Marc came to our office at midnight and read the letter I'd written to our community about the Airbnb Guarantee, and the two changes he made changed the company forever. I'd said we guarantee five thousand dollars for property damage, and he added a zero, which seemed crazy." Andreessen also added the proviso that claimants would have to file a police report, which he correctly believed would discourage scam artists. "And he told me to add my personal e-mail address. He gave us permission to be bold."

In venture, it's not batting average that matters; it's slugging average. Boldness is all. When Google Glass appeared, a16z joined a collective to seek out investments, and Andreessen declared that, without the face shield, "people are going to find they feel, basically, naked and lonely." Google withdrew the product in January. But, he would argue, so what? His thesis is that such a16z failures as Fab and Rockmelt and Digg and Kno are not merely a tolerable by-product of the risk algorithm but a vital indicator of it. It's fine to have a lousy record of predicting the future, most of the time, as long as when you're right you're really right. Between 2004 and 2013, a mere 0.4 per cent of all venture investments returned at least 50x. The real mistakes aren't the errors of commission, the companies that crash—all you can lose is your investment—but those of omission. There were good reasons that a16z passed on buying twelve per cent of Uber in 2011, including a deadline of just hours to make a decision. But the firm missed a profit, on paper, of more than three billion dollars.

The beauty of betting on risky technologies is that you're sometimes proved right, eventually—perhaps we'll all feel naked without Google Glass 3.0. When reverses occur, Andreessen tends to believe that he wasn't wrong so much as overly prescient. Yet, while he professes intellectual comfort with being wrong, he never mentions Ning, a social-networking company that he co-founded in 2004, because, as he conceded when I asked about the elision, "It didn't do great." And he can be touchy about criticism. At one Q. & A. I attended, when the interviewer read him a snarky quote from Sam Biddle, a writer who worked for the gossip site Valleywag, Andreessen made a doobie-smoking gesture and plunged an imaginary needle into his vein to suggest the quality of Biddle's thinking. Being the public face of venture means that you can be challenged on multiple fronts: even as you philosophize about ushering in a new age of democracy, you also have to make money for your L.P.s. And, while the ideal startup advances both goals, most, in truth, advance neither. The V.C. Bryce Roberts told me, "It's an ego game, where you want to believe you're changing the world. But how can you write a check to Fab and believe that giving people discounted tchotchkes is changing the world?"

In 1999, Andreessen and Horowitz started Loudcloud, an early cloud-computing service that booked thirty-seven million dollars in contracts in its first nine months. Andreessen, meanwhile, was becoming Marc 2.0. He shed thirty pounds, started wearing Ermenegildo Zegna suits, and traded in his red Mustang for a white Mercedes. "Marc 1.0 was Jim Clark," Andreessen told me, referring to his impulsive co-founder. "Marc 2.0 was trying to get as polished as possible, more socialized. And Marc 3.0 is a combo. The goal is not to be elegant but to be blunt enough that there's no confusion. I learned the skills from reading all of Caro's L.B.J. books."

The dot-com crash hit Loudcloud hard, and, in 2002, it pivoted to become a software company with a new name: Opsware. In 2007, after years of slogging, Andreessen and Horowitz sold the company for $1.6 billion. Andreessen says that the tech crash scarred him: "The overwhelming message to our generation in the early nineties was 'You're dirty, you're all about grunge—you guys are fucking losers!' Then the tech boom hit, and it was 'We are going to do amazing things!' And then the roof caved in, and the wisdom was that the Internet was a mirage. I one hundred per cent believed that, because the rejection was so *personal*—both what everybody thought of me and what I thought of myself. I was not depressed, but I was growly. In retrospect," he concluded, "we were five or six years too early."

Peter Thiel, who is four years older than Andreessen, observed that "the late nineties, for Gen Xers in Silicon Valley, was an experience as powerful as the late sixties was for the younger boomers. The sixties was a transformative moment that got short-circuited by Nixon, and, for Marc, the nineties—when Netscape was iconic, and he was deeply living the belief that technology was going to inspire liberalization everywhere—was short-circuited by the super-powerful bust and return



"They all lead back to this ball of yarn."

of the old economy. But Marc is very tenacious."

Andreessen said he learned that, while technology improves steadily, "psychologically there's no middle ground—the plane is always headed straight up or straight down." Recognizing that he was a poor manager, and needing to buffer those emotional and financial swings, Andreessen saw that the obvious next move was a portfolio of investments. In 2003, he and Horowitz began angel investing, separately and then together; they put ten million dollars into fifty companies, including Facebook, Twitter, and LinkedIn. Then Andreessen began pushing to start a venture firm. "I always thought the entire venture thing was incredibly cool," he told me. "Going to Kleiner Perkins"—the firm that funded Netscape—"with the high ceilings, the markers on the wall of all the great companies they'd I.P.O.'d, Larry Ellison walking through, and, at 11 A.M., the biggest buffet you've ever seen, at a time when I was eating at Subway? It was the closest thing to a cathedral for nerds." Mark Zuckerberg told me, "When Marc started Andreessen Horowitz, I asked him why he didn't start another company instead, and he said, 'It would be like going back to kindergarten.'"

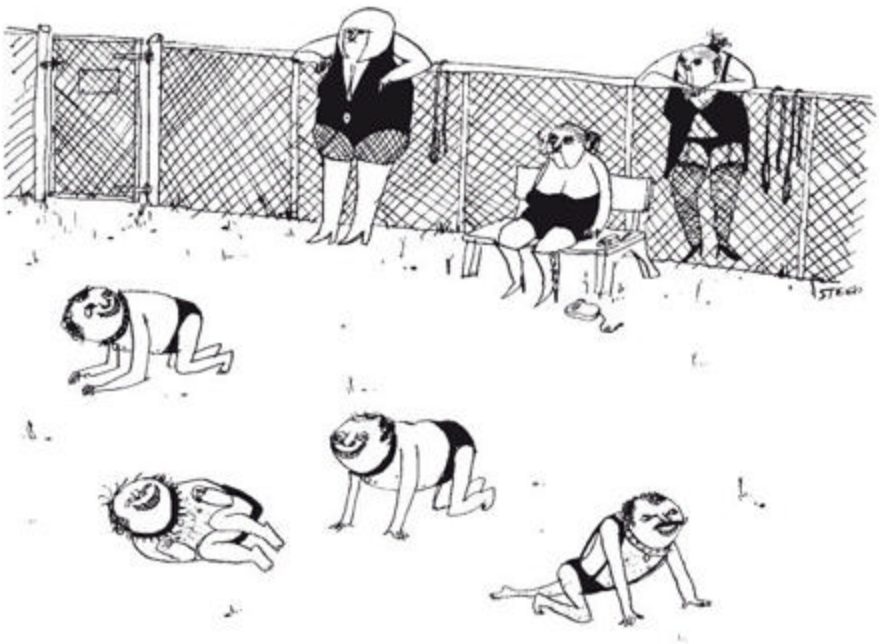
A16z was designed not merely to succeed but also to deliver payback: it would right the wrongs that Andreessen and Horowitz had suffered as entrepreneurs. Most of those, in their telling, came from Benchmark Capital, the firm that funded Loudcloud, and recently led the A rounds of Uber and Snapchat—a five-partner boutique with no back-office specialists to provide the services they'd craved. "We were always the anti-Benchmark," Horowitz told me. "Our design was to *not* do what they did." Horowitz is still mad that one Benchmark partner asked him, in front of his co-founders, "When are you going to get a real C.E.O.?" And that Benchmark's best-known V.C., the six-feet-eight Bill Gurley, another outspoken giant with a large Twitter following, advised Horowitz to cut Andreessen and his six-million-dollar investment out of the company. Andreessen said, "I can't stand him. If you've seen 'Seinfeld,' Bill Gurley is my Newman"—Jerry's bête noire.

A16z's services model made a strong impression on Sand Hill Road. "Andreessen caused us to up our game on the marketing side," Sequoia's Doug Leone told me. "Younger founders pay attention to media, and we don't want to be de-positioned." Sequoia hired an in-house publicist and two new marketing specialists to complement the four it had, and most top firms made similar moves, even if they privately believed that a16z's services were simply a marketing tool. Todd McKinnon, the C.E.O. of Okta, said, "Every firm we talk to now is 'Hey, we're doing all this recruiting, and we'll introduce you to big customers.' It's become the table stakes."

Benchmark, by contrast, took down its Web site. "It's like watching Coke and Pepsi go head to head," one C.E.O. told me. Bill Gurley declined my requests for comment, but he has publicly bemoaned all the money that firms such as a16z are pumping into the system at a time when he and many other V.C.s worry that the tech sector is experiencing another bubble. So many investors from outside the Valley want in on the startup world that valuations have been soaring: last year, thirty-eight U.S. startups received billion-dollar valuations, twenty-three more than in 2013. Many V.C.s have told their companies to raise as much money as possible now, to have a buffer against a crash.

Benchmark's funds top out at four hundred million dollars and are reserved for early-round investing: the original, artisanal venture model. A16z raised $1.5 billion each for its third and fourth funds, in 2012 and 2014, with much of the money earmarked for later, costlier growth rounds, whose returns tend to be capped at 5x. Andreessen argues that startups now wait longer and raise more capital before going public, and a16z wants to be in those conversations, too. He also says that larger funds will allow the firm to provide even more of the services that its entrepreneurs crave. But, in the Valley, increasing your fund size so dramatically is customarily seen as "smoking your own exhaust," or, among those with a classical turn of mind, hubris. "Venture doesn't scale," Diane Mulcahy, the L.P. and venture critic, said. "Raising and investing more doesn't increase the number of billion-dollar companies, and offering services to entrepreneurs won't help the firm generate returns. It's like a Saks Fifth Avenue that gives everybody a free iPhone. Are they going to attract everybody and see everybody? Yes. Are they going to make money? Not for long."

When I pressed Andreessen on a16z's fund size, he said that even if the basic assumptions haven't changed—even if only fifteen companies a year reach a hundred million dollars in revenue—those companies generate more money now. And, he said, "I'd bet the number of companies that reach that revenue is going up." With a playful smile, he referred to Gurley: "If there's no profit opportunity beyond the first four hundred

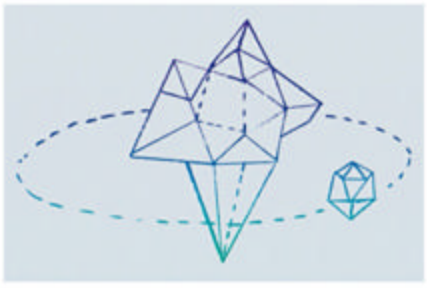


million, Bill's making the case that everyone who follows Benchmark in a later investment round is a moron. *I* wouldn't say that."

One morning, as I sat down to breakfast with Andreessen, a rival V.C. sent me a long e-mail about a16z's holdings. The V.C. estimated that because Andreessen's firm had taken so many growth positions, its average ownership stake was roughly 7.5 per cent (it's eight per cent), which meant that to get 5x to 10x across its four funds "you would need your aggregate portfolio to be worth $240-$480B!" You would, in other words, need to invest in every Facebook and Uber that came along. When I started to check the math with Andreessen, he made a jerking-off motion and said "Blah-blah-blah. We have all the models—we're elephant hunting, going after big game!"

In addition to assuaging various slights from V.C.s, Andreessen is attempting to assuage the wound of the 2000 crash, by maintaining that it was an isolated event. "The argument in favor of concern is cyclical," he told me—busts follow booms. "The counterargument is that stuff *works* now. In 2000, you had fifty million people on the Internet, and the number of smartphones was zero. Today, you have three billion Internet users and two billion smartphones. It's Pong versus Nintendo. It's Carlota Perez's argument that technology is adopted on an S curve: the installation phase, the crash—because the technology isn't ready yet—and then the deployment phase, when technology gets adopted by everyone and the real money gets made." So the 2000 tech crash prefigured not the next crash but a sustained boom. And Andreessen's portfolio, like the entire Sand Hill Road enterprise, wasn't so much overpriced as underappreciated.

Still, he recently tweeted that startups were spending too much. When the market turns, he wrote, "nobody will want to buy your cash-incinerating startup. There will be no Plan B. VAPORIZE." And, come to think of it, maybe it wasn't prudent to raise too much, either. In one pitch meeting where a portfolio company sought a billion-dollar growth round, Andreessen raised his arms overhead and made an explosive sound to warn of what can happen when your valuation vastly exceeds your revenues: "Thanks for playing—game over!" The company went on to secure its round, with only a token contribution from a16z. Andreessen later said that, as in an increasing number of deals, growth investors had paid one round ahead of progress—paid in other words, for the results they hoped to see in the following round. Though the company's lofty valuation buoyed a16z's portfolio, his body language suggested that buying at such valuations was maybe not smart—"but, as long as they're sophisticated investors, it's not our job to moralize on whether they're overpaying."



Another way of framing the growth-funding question, Peter Thiel suggests, is that Andreessen may not be as suited to making early, counterintuitive investments as he is—a point that Andreessen concedes: "Peter is just smarter than I am, and in a lateral way." But, Thiel says, Andreessen is well positioned, because of his broad knowledge and flexible mind-set, to respond to incremental changes in an array of fields. And that, he argues, is what the times reward: "While Twitter is a lesser innovation than flying cars, it's a much more valuable business. We live in a financial age, not a technological age."

In December, Apoorva Mehta, the founder of a grocery-delivery app called Instacart, came to a16z to ask it to fill out his C round. The firm had led Mehta's B round with an investment of twenty-seven million dollars, but he reminded the team anyway that Instacart "is quite a magical experience." Then he invoked a few sharing-economy shibboleths, including "we don't have any infrastructure," "mobile-powered independent contractors," and "machine-learning-based fulfillment engine." In two years, Mehta had set up in fifteen cities, signed up many of the independent grocery chains, including Whole Foods, and showed profitability in a number of stores. And it was a defensible network, because he installed refrigerated lockers in the stores. At the same time, because Mehta had recently changed his model, Instacart was losing money on each delivery, and that amount was growing as he rapidly expanded into new markets.

Andreessen applied a disinfecting wipe and said, "Let me ask you a question I know the answer to. In 1999, there was no more flaming debacle of a business than grocery delivery online. You were probably twelve at the time of Webvan?"

"Thirteen," Mehta said.

"So why now?"

"The main reason is you have access to labor through smartphones. It's the same reason Uber and Lyft exist now."

Andreessen nodded with satisfaction: "You can orchestrate the entire supply chain through your phone." Webvan was what he called a "ghost story"—a cautionary tale that still frightened investors. But Instacart proved that even haunted houses could be rehabilitated.

Another partner asked about competitors, including Uber, TaskRabbit, Amazon Fresh, and Fresh Direct. "The other, older models can't do instant delivery," Mehta replied. "And the newer ones don't have anywhere near our coverage and range of data in groceries. So if you want slower delivery and smaller selection, go with them." Andreessen smiled, savoring the contempt.

At the deal review, Jeff Jordan, who sits on Instacart's board, praised Mehta's progress, while noting concerns about unit economics—how he'd get to profitability on each delivery. Referring to the venture community's enthusiasm for the round, Jordan went on, "This is an 'I missed Uber, I don't want to miss the next one' climate." Balancing everything, he recommended that the firm put in ten million dollars.

Horowitz argued for a bigger investment. Mehta's moat against competitors "is really fucking deep—he already has Whole Foods, monster of monsters. It's the biggest market of all time, incredibly huge."

After other partners argued that the valuation seemed high, Andreessen looked at Horowitz: "Ben, I think you're making an even more provocative point than people understand. It sounds like you're saying this could be an Uber for real."

"I think so," Horowitz said. "What

makes unit economics really scary is if you're in a competitive market. He's in a monopoly."

Andreessen said, "We could go to the well, and go in higher." He beckoned, coaxingly. Horowitz thought it over, then said, "I don't want to override Jeff." Andreessen, too, seemed content to temper his enthusiasm and to share the round with other firms. (Mehta eventually raised two hundred and twenty million dollars on a valuation of two billion.) He'd like to make twenty times the investments the firm does, but every opportunity comes with an opportunity cost, and even $1.5 billion doesn't last forever.

Andrew Golden, the chief investment officer for Princeton University, an L.P. in a16z's last three funds, told me that, when the firm started, "my worry was that Marc is such a big personality he wouldn't necessarily listen to someone who told him he was wearing fewer clothes than he thought. But now my working hypothesis is that Marc is smart enough to know that he'll do better if he doesn't try to win every argument—if he doesn't try to go undefeated."

In March, Andreessen and his wife announced the birth of their son, who'd been carried to term by a gestational surrogate. They named him John, for Laura's father. "I feel fantastic!" Andreessen told me. "He'll come of age in a world where ten or a hundred times more people will be able to contribute in science and medicine and the arts, a more peaceful and prosperous world." He added, tongue in cheek, "I'm going to teach him how to take over that world!"

Andreessen often remarks that, in the blue-collar milieu he came from, no parent wants his or her child to stay blue-collar. His own circumstances have changed dramatically—he is now a paper billionaire, though he argues that his net worth depends on how you value a16z—so I told him it seemed paradoxical that some of his other babies, such as Instacart and Lyft, make their profits off blue-collar drivers and pickers who must freelance without a safety net to make ends meet. Unsurprisingly, he strongly disagreed: "Maybe there's an alternate way of living, a free-form life where you press the button and get work when you want to."

One afternoon, as we sat at his baronial dining table, he made an agonized but sincere effort to discuss his blue-collar childhood without mentioning his nuclear family. "I really identified with Charles Schulz in the David Michaelis biography of him, 'Schulz and Peanuts,'" he said. I was struck by the parallels between Andreessen and both "Peanuts"—in which Charlie Brown has a massive bald head and the parents are kept offstage—and its creator. Charles Schulz, who grew up in Minnesota, was socially awkward, hated being embraced, and loathed his mother's Norwegian relatives, a farming family. Andreessen went on, "Ninety-six per cent of the people who grow up like he and I did, in the Midwest, just stay there, but the ones who leave"—the cartoonist, too, moved to California—"become intensely interested in the future. In Schulz's last ten years, he really focussed on Rerun, Linus's younger brother—the youngest and most optimistic character."

I told Andreessen that this seemed like a tendentious reading of Rerun, a bland character whose two most famous lines are "I'll drink to that" and "My brother is the only one in the family with a blanket, and I don't want to end up like him." Taken aback, he explained, "He's the youngest, he's the newest, he has the most life in front of him." Andreessen, as he saw himself, was both an immigrant to the land of opportunity, like the entrepreneurs he preferred to fund, and someone whose childhood was merely an installation phase. He told me, "It wasn't that I felt misunderstood or badly treated; it was that I was so completely different. I wasn't seeking understanding. I wasn't indexing myself against the people around me."

Andreessen reminded me—in his formidable achievements and manner, his thickly armored sensitivities and yearnings—of Rilke's remark "Perhaps everything that frightens us is, in its deepest essence, something helpless that wants our love." When I told him so, he stared back in absolute horror.

Last year, a programmer named Alex Payne wrote an open letter to Andreessen in which he observed, "People are scared of so much wealth and control being in so few hands. Consequently, wherever you and other gatekeepers of capital direct your attention—towards robots, 3D printers, biotech, whatever—you're going to detect a fearful response as people scramble to determine the impact of your decisions and whims," which only compound "lingering structural unemployment and an accumulation of capital at the top of the economic pyramid."

Payne addressed his thoughts to Andreessen because Andreessen represents the Valley—both in its soaring vision and in its tendency to treat people as a fungible mass. But Andreessen waved away the criticisms as the ravings of "a self-hating software engineer." When I persisted, he said, "Ordinary people love the iPhone, Facebook, Google Search, Airbnb, and Lyft. It's only the intellectuals who worry." He raised counterarguments, then dismissed them: technology would solve any environmental crisis hastened by an expanding economy, and as for the notion that, as he said, " 'You American imperialist asshole, not everyone wants all that technology'—well, bullshit! Go to a Chinese village and ask them." Technology gives us superpowers, makes us smarter, more powerful, happier. "Would the world be a better place if there were fifty Silicon Valleys?" he said. "Obviously, yes. Over the past thirty years, the level of income throughout the developing world is rising, the number of people in poverty is shrinking, health outcomes are improving, birth rates are falling. And it'll be even better in ten years. Pessimism always sounds more sophisticated than optimism—it's the Eden-collapse myth over and over again—and then you look at G.D.P. per capita worldwide, and it's up and to the right. If this is collapse, let's have more of it!"

Global unemployment is rising, too—this seems to be the first industrial revolution that wipes out more jobs than it creates. One 2013 paper argues that forty-seven per cent of all American jobs are destined to be automated. Andreessen argues that his firm's entire portfolio is creating jobs, and that such companies as Udacity (which offers low-cost, online "nanodegrees" in programming) and Honor (which aims to provide better and better-paid in-home care for the elderly) bring us closer to a future in which everyone will either be doing more interesting work or be kicking back and painting sunsets. But when I brought up the raft of data suggesting

that intra-country inequality is in fact increasing, even as it decreases when averaged across the globe—America's wealth gap is the widest it's been since the government began measuring it—Andreessen rerouted the conversation, saying that such gaps were "a skills problem," and that as robots ate the old, boring jobs humanity should simply retool. "My response to Larry Summers, when he says that people are like horses, they have only their manual labor to offer"—he threw up his hands. "That is such a dark and dim and dystopian view of humanity I can hardly stand it!"

One challenge for Andreessen is whether venture itself has a skills problem. If software is truly eating the world, wouldn't venture capital be on the menu? The AngelList platform now allows investors to fund startups online. Its co-founder Naval Ravikant said that "future companies will require more two-hundred-thousand-dollar checks and way fewer guys on Sand Hill Road." Jeff Fagnan, of Atlas Venture, which is the largest investor in AngelList, said, "Software is already squeezing out other intermediaries—travel agents, financial advisers—and, at the end of the day, V.C.s are intermediaries. We're all just selling cash."

Andreessen sometimes wonders if Ravikant is onto something. He's asked Horowitz, "What if we're the most evolved dinosaur, and Naval is a bird?" Already, more than half the tech companies that reached a billion-dollar valuation in the past decade were based outside Silicon Valley. And as Andreessen himself wrote in 2007, before he became a V.C., "Odds are, nothing your V.C. does, no matter how helpful or well-intentioned, is going to tip the balance between success and failure."

He still believes that—but he also thinks that a16z can cut a company's time to success in half, and time is money. He also believes that venture will maintain its incumbency because computers can't yet introduce you to just the right engineer or chief information officer at eBay, and machines can't yet come to your office at midnight to future-proof your letter to perturbed customers. Indeed, venture is one of the most human businesses going. Only human beings could have created such a supercollider of contradictions: a font of innovation that pools around conformity; a freedom train that speeds toward monopoly; a promoter of transparency that shrouds its own dealings; a guild that's dedicated to flattening hierarchies, and that rewards its leaders with imperial power.

Naturally, Andreessen had to weigh the counterargument, and consider whether he added any value at all. One Sunday afternoon, as he sat alone at the head of a16z's conference table, he said, "Chris Dixon argues that we're in the magical-products business—that we fool ourselves into thinking we're building companies, but it doesn't matter if we don't have the magical products." And magic could not be summoned, only prepared for. "Over twenty years," he continued, "our returns are going to come down to two or three or four investments, and the rest of this"—his gesture took in the building full of art, the devotions of more than a hundred eager souls, even the faux-Moorish rooftops of his competitors down the road—"is the cost of getting the chance at those investments. There's a sense in which all of this is math—you just don't know which Tuesday Mark Zuckerberg is going to walk in."

Yet math was no help with mass psychology. "Even if we could do perfect analysis, we just can't know the future," he said. "What if Google Ventures had access to all Google searches—could you predict hit products? Or perfect access to all of people's conversations or purchases? You still wouldn't know what's going to happen. How is psychohistory going?" he went on, referring to Isaac Asimov's invention, in his "Foundation" novels, of a statistical field that could predict the behavior of civilizations. "Not very fucking good at all! Which, by the way, is part of what makes this job really fun. It's a people business. If we could revise the industry completely, we'd just dump all the business plans and focus on people—the twenty-three-year-old Mark Zuckerberg, Bill Gates, Steve Jobs."

He acknowledged, though, that his optimism dims once human beings—with their illogic, hidden agendas, and sheer bugginess—enter the equation. "We're imperfect people pursuing perfect ideas, and there's tremendous frustration in the gap," he said. "Writing code, one or two people, that's the Platonic ideal. But when you want to impact the world you need one hundred people, then one thousand, then ten thousand—and people have all these *people* issues." He examined the problem in silence. "A world of just computers wouldn't work," he concluded wistfully. "But a world of just people could certainly be improved." ♦



"You two are fired as security guards. Now gather up your things and escort each other from the building."

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By rendering individual neurons photosensitive, Deisseroth's technique brings a once unthinkable level of precision and control to

PHOTOGRAPH BY IOULEX



PROFILES

LIGHTING THE BRAIN

Karl Deisseroth and the optogenetics breakthrough.

BY JOHN COLAPINTO

experiments designed to determine how the brain processes information and drives behavior.

On a recent Friday morning, a gray-haired woman whom I will call Sally arrived for an appointment with Karl Deisseroth, a psychiatrist and a neuroscientist in the bioengineering department at Stanford University. Sally, now in her sixties, had suffered since childhood from major depression, and had tried the standard treatments: counselling, medication, even electroconvulsive therapy. Nothing helped. She had spent much of her adult life in bed, and had twice attempted suicide. Seven years ago, she was referred to Deisseroth, who uses a combination of unusual medications and brain stimulation to treat autism and severe depression. He accepts only patients for whom all other treatments have failed.

On Deisseroth's advice, a surgeon implanted beneath Sally's left collarbone a small, battery-powered device that regularly sends bursts of electricity into the vagus nerve, which carries the signal into a deep-brain structure that doctors think regulates mood. Originally developed for epilepsy, vagus-nerve stimulation (VNS) has been approved by the Food and Drug Administration for use in the kind of treatment-resistant depression from which Sally suffers, but the exact reason for its effectiveness is not understood. Sally says that VNS has transformed her life, and that, apart from one period of "going pancake," she has experienced just a few "dips."

She seemed to be in one of those dips when she took a seat facing Deisseroth. "There's just so much going on," she said. She had recently suffered a blackout, which her physician thought might be related to a drop in blood pressure, and she had decided, reluctantly, to stop driving until she understood why it had happened. Walking was hard, too; she was scheduled to have knee surgery soon, but it frightened her.

"Well, that's a lot to think about," Deisseroth said. He spoke quietly but with a positive lilt, countering the downward tug of Sally's mood. "Not super-low blood pressure," he said, scanning her chart. "So that's actually not as concerning as I thought." Of her decision to suspend driving, he said, "That is smart while it's

being figured out." He added, "You're still socializing, I see—which is very important."

She was not mollified. "Mood's been down," she said. "Just spiralling down." She mentioned insomnia, bad dreams, low appetite.

"No suicidal thoughts?" he asked.

"Mmm, no," she said. With sudden urgency, she asked to have the VNS current increased: "Can we *please* go up to 1.5?" She had been receiving 1.2 milliamps every five minutes for thirty seconds, but was no longer able to feel the effects.

"You're tolerating the device very well," Deisseroth said, after some discussion. "I think we can go up a little."

He handed her a programming wand, which looked a little like a Wii remote. She placed the broad, flat end against her left collarbone, over the implant. Deisseroth took from his desk what appeared to be a smartphone—a controller for the wand—and thumbed the screen as if tapping out a text. The wand emitted a trilling tone. "I can feel it," she said.

"But you're not coughing," he said. "That's good."

Problems with the throat are not the only side effects of VNS. Cells outside the targeted treatment area can be roused, affecting cognition. After increasing the voltage, Deisseroth asked Sally that day's date and the counties she'd travelled through to get to his office, and to count backward from a hundred by sevens. She performed all the tasks. "Good," he said. "Flawless cognition."

In the course of the next few minutes, Sally underwent a remarkable change. Her frown disappeared, and she became cheerful, describing the pleasure she'd had during the past Christmas holiday and recounting how she had recently watched some YouTube videos of Deisseroth. ("The N.I.H. in June—your demeanor behind the podium is, like, *Wow!* Very strong.") She was still smiling and talking when the session ended and Deisseroth walked her out to the reception area.

Later, Deisseroth told me that Sally's response to the treatment was good evidence for the efficacy of VNS. But it also provided valuable insight for Deisseroth in his work as a neuroscientist. "When I'm sitting in front of a patient and hearing what they're feeling, it concentrates the mind wonderfully," he says. "It's a source of hypothesis, a source of ideas."

For much of the history of brain research, it has been nearly impossible to accurately test ideas about how the brain works. "When we have the complexity of any biological system—but particularly the brain—where do you start?" Deisseroth says. Among scientists, he is best known for his development of optogenetics, a technology that renders individual, highly specific brain cells photosensitive and then activates those cells using flashes of light delivered through a fibre-optic wire. Optogenetics has given researchers unprecedented access to the workings of the brain, allowing them not only to observe its precise neural circuitry in lab animals but to control behavior through the direct manipulation of specific cells. Deisseroth, one of the rare neuroscientists who are also practicing psychiatrists, has made mental illness a major focus of his optogenetic research. Other scientists around the world are using the method to investigate some of the most stubborn riddles of neuroscience, including the fundamental question of how the physical brain—the nearly hundred billion neurons and their multitudinous connections—gives rise to the mind: thought, mood, behavior, emotion.

In the late seventeen-hundreds, the Italian physician Luigi Galvani noticed that static electricity could induce a dead frog's leg to move. For the first time, scientists understood that the nervous system operates under the influence of electrical activity. But it was not until the nineteen-twenties that a Swiss researcher, Walter R. Hess, using implanted wires to stimulate the brains of cats, showed that emotion and behavior also arise from electrical impulses in the brain. By stimulating various brain regions, Hess induced different reactions: for example, a cat could be made to show the defensiveness it might otherwise display when confronted by a dog.

In the nineteen-fifties, a Spanish physiologist at Yale, José Manuel Rodriguez Delgado, conducted experiments with electrodes implanted in the brains of human subjects, using a device he had invented, called a "stimoceiver," a half-dollar-size electrode operated by remote control. Delgado used the stimoceiver in some twenty-five patients, most of them epileptics and schizophrenics in a Rhode Island mental hospital, and reported that it was "possible to induce a large variety of responses, from motor effects to emotional reactions and intellectual manifestations." The experiments sparked outrage when they were made public, and Delgado returned to Spain.

The ethical concerns inherent in implanting electrodes in human brains gave way, in the early nineteen-nineties, to the adoption of a wholly noninvasive brain-imaging technology: functional magnetic resonance imaging, or fMRI. It was instrumental in bolstering the theory that the brain is divided into discrete regions responsible for different aspects of behavior. The technology uses powerful magnets to detect changes in blood flow in the brain in subjects who are exposed to various stimuli—images, sounds, thoughts. Activated regions can be presented on a screen as luminous blobs of color. But fMRI has severe limitations. There is a time lag, and different neuronal events that happen a second or more apart can blur together when the excited area appears onscreen—a liability in studying an organ that works at millisecond speed. Nor can fMRI reveal what brain cells are actually doing. The technique registers activity only at the scale of hundreds of thousands of neurons, and a lit-up area might represent any number of neural processes. Given this lack of precision, even some of fMRI's defenders offer faint praise. Nancy Kanwisher, of M.I.T., who has done groundbreaking work to isolate a brain region implicated in face recognition, says, "The real miracle of fMRI is that we ever see anything at all."

To analyze the role of small groups of neurons, scientists have relied on a method not unlike the one that Hess used with his cats: stimulating targeted brain areas, in experimental animals, with thin electrodes. Because electrodes spread current through brain

tissue, stimulating activity in unwanted areas, researchers use a drug to suppress neural activity. But the method is cumbersome and time-consuming.

In 2005, Deisseroth published his first paper on what came to be known as optogenetics. Because the technology permits researchers not only to trigger the activity of cells at the speed that the brain actually works but also to target cells in regions, like the amygdala, where there are mixed populations of hundreds of kinds of cells, optogenetics offers a previously unthinkable level of experimental precision. At present, optogenetics can be used only on animals like mice and rats, whose brain functions associated with elemental emotions, like fear and anxiety and reward, are similar to those in humans. But Deisseroth's work with patients like Sally, whose VNS implant allows him to control emotions and behavior, hints at what may one day be possible.

Christof Koch, the chief scientific officer of the Allen Institute for Brain Science, in Seattle, calls optogenetics one of the most momentous developments in neuroscience in the past hundred and sixty years—from the original dye-staining of cell types, in the late nineteenth century, through the use of electrodes, in the fifties and sixties, to the advent of fMRI. "Optogenetics is the fourth wave," Koch told me. "I can now begin to intervene in the network of the brain in a very delicate, deliberate, and specific way." Experiments have shed light on many brain functions, including learning, memory, metabolism, hunger, sleep, reward, motivation, fear, smell, and touch.

Optogenetics was a major spur to the Obama Administration's announcement, in 2013, of the BRAIN Initiative, a three-hundred-million-dollar program for developing technologies to treat such neurological ailments as Alzheimer's disease, autism, schizophrenia, and traumatic brain injury. Deisseroth was part of the working group that created the Initiative and has vetted grant applications for it.



"First time, long time."

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Deisseroth, who is forty-three, has dark hair that falls into droopy eyes. His voice rarely rises above a murmur, and he comes across as unusually easygoing for someone who developed a transformative neuroscience technology before he was forty. The Stanford neuroscientist Rob Malenka, who oversaw Deisseroth's postdoctoral work, told me that in some ways he underestimated his trainee. "I knew he was really smart. I didn't appreciate that underneath that laid-back, almost surfer-dude kind of persona is this intense creative and intellectual drive, this intense passion for discovery. He almost hides it by his presentation."

Dressed in his usual T-shirt, jeans, and scuffed leather jacket, driving around campus in a dented gray Chevy pickup, Deisseroth could be mistaken for a slightly shambolic creative-writing professor. His initial dream, in fact, was to write. He took writing courses as an undergraduate, and when he was a graduate student in both medicine and neuroscience at Stanford he took a fiction-writing class that met two nights a week at a junior college nearby. He remains an avid reader of fiction and poetry, and he is polishing a book of short stories and essays loosely inspired by Primo Levi's "The Periodic Table." Deisseroth says that he perceives a connection between scientific inquiry and creative writing: "In writing, it's seeing the truth—trying to get to the heart of things with words and images and ideas. And sometimes you have to try to find unusual ways of getting to it." His fiction bears little resemblance to the technical prose of his neuroscience papers. In a short story describing his first encounter with a schizoaffective patient as a medical intern, Deisseroth wrote that the man's disordered speech was "Finnegans Wake on the psych ward," a "soliloquy of suffering" that evoked "science and art together, not in parallel but as actually the same idea, fused, as if I were hearing a Gerard Manley Hopkins poem on neurobiology."

One morning, when I was scheduled to meet Deisseroth in Palo Alto, I found him standing at the curb with an elderly motorist who had just added a fresh dent to the back of Deisseroth's truck. The man was agitated. After unhurriedly talking him into a state of calm, then exchanging phone numbers, Deisseroth climbed into the driver's seat, nudged aside some teething rings (he has three children under the age of six, along with an eighteen-year-old son from an earlier marriage), and asked if I'd slept well. He seemed

to have put the accident entirely behind him—even though it had made him late for an important meeting. Many people, I said, would still be discombobulated. "Like those poker players who have a bad hand at the beginning of the night and can't get back on track?" he said, with a smile. "They call it being 'on tilt.'"

Deisseroth seems never to be on tilt. He attributes this partly to his psychiatric training: "Those nights on call where there are five emergencies, you've got a patient in restraints in the E.R., where they need you immediately, patients up on the psychiatry floor, where someone punched a nurse—you develop a little bit of a 'just get through it one thing at a time.'" His unusual calm has allowed him to compartmentalize competing demands (fatherhood, marriage, neuroscience, literary endeavors, clinical psychiatry, speaking appearances at dozens of conferences a year), so that he can think through complex problems. He told me that, while many people find that walking or jogging shakes ideas loose from the subconscious, he needs to quell all physical activity. "Otherwise, I get this disruption from the motor cortex," he said. "I have to be totally still." Ideas come floating up "like a bubble in liquid." At that point, he goes into an excitable motor state, pacing or scribbling down ideas.

His wife, Michelle Monje—a neuroscientist who specializes in pediatric brain cancer—has seen the process in action often. "He had this idea of controlling specific brain cells years before actually being able to accomplish it," she says. "It was so out there. Like, 'Yeah, that would be great—if it *worked*.'"



"Oh, sorry—I think I just butt-summoned you."

Deisseroth was born in Boston, but he grew up all around the country as his father, a hematologist-oncologist, followed a series of postings from Boston to Potomac, Houston, and Marin County. His mother taught high-school physics and chemistry; the elder of his two sisters is an orthopedic surgeon, the younger a clinical psychologist. Deisseroth loved reading—he recalls riding his bike with a book open on the handlebars, and crashing into parked cars—but he was also a classic science kid. "I stopped and looked at bugs and thought about how they were making their decisions," he says. "And I inspected roadkill with great intensity."

He was in the third grade when he learned that his own brain functioned in an unusual way. A teacher asked the class to choose a poem to recite from memory. Deisseroth opened his reader, looked at a page containing "The Road Not Taken," and put his hand up. When the teacher explained that he needed to memorize the poem first, he said that he already had, and recited it. The teacher, disbelieving, spent the rest of the class calling on him to quickly glance at a poem and then recite it. "It kind of turned into a circus act," Deisseroth says.

He remains a preternaturally fast and retentive reader. At a recent conference, he attended a talk by David and Nic Sheff, the father-and-son authors of the addiction memoirs "Beautiful Boy" and "Tweak." In the course of an hour, while listening to the two men, Deisseroth read both books in their entirety. He does not use the standard techniques of speed-reading but, instead, sees printed pages "in blocks," he says, and instantly "fills in gaps." Colleagues suggest that this ability helped Deisseroth to acquire the wide-ranging knowledge necessary for the development of optogenetics, which required a working familiarity with virology, optics, animal behavior, genetics, 3-D imaging, microbiology, materials science, and chemistry.

Deisseroth graduated from high school at sixteen and won a scholarship to Harvard, where he planned to major in creative writing. Instead, he ended up getting a degree in biochemistry, and was admitted, at the age of twenty, to Stanford's combined M.D. and Ph.D. program. Motivated by a desire to better understand human nature, he decided to pursue his Ph.D. in neuroscience. "I didn't come in by asking, 'How many bits per second can flow through a pathway?'" he says. "I came in—maybe from the literature exposure—wanting to know where feeling came from. How you could be uplifted by words. How imagination worked."

For his Ph.D., he studied how activity at the synapses of neurons affects the nucleus and influences gene expression, a highly specialized subject but one that is central to an important aspect of being human: memory. "There was all this evidence coming out that changes in gene expression were important for things like long-term-memory storage," Rob Malenka says. "Karl—in what I now understand was his typical way—was asking, 'What's a big question, a big topic that hasn't been adequately addressed?'" Deisseroth's dissertation, which he completed in 1998, spawned papers in the journals *Neuron* and *Nature*.

Deisseroth had initially planned to become a neurosurgeon, but he changed his mind after doing a mandatory four-week rotation in psychiatry, where his first patient was the schizoaffective man whose speech he compared, in his short story, to "Finnegans Wake." Deisseroth prescribed strong antipsychotic and mood-stabilizing medications, but the man remained too overcome by the disorder to leave the psych ward. Deisseroth was both disappointed and fascinated. "It was the unknown that grabbed me," he says. "I knew how far we were from a glimmer of understanding."

During his residency, he struggled to reconcile his lab research with the ailing people he talked with on the ward. Malenka recalls, "He'd spend all day seeing patients, then rush over to my lab and spend four or five hours running experiments." He was frustrated that psychiatry's view of the most intractable disorders—severe depression, schizophrenia, autism—was limited by a fundamental lack of understanding of how the brain works. "A cardiologist can explain a damaged heart muscle to a patient," Deisseroth told me. "With depression, you cannot say what it really is. People can give drugs of different kinds, put electrodes in and stimulate different parts of the brain and see changed behavior—but there is no tissue-level understanding." He added, "That problem has framed everything. How do we build the tools to keep the tissue intact but let us see and control what's going on?"

In 1979, Francis Crick, the co-discoverer of the double helix, published an article in *Scientific American* in which he laid out his hopes for the future of brain science. Neuroscientists were already routinely using electrodes to stimulate the brain, but Crick, noting the method's imprecision, called for a tool that would allow researchers to turn specific neurons on and off, while leaving other cell types untouched. In a later paper, he suggested a way to achieve it: "This seems rather far-fetched, but it is conceivable that molecular biologists could engineer a particular cell type to be sensitive to light."

It turned out that the key to engineering such a cell had already been discovered, in the early seventies, when a German biochemist named Dieter Oesterhelt described the first microbial opsin. Opsins are light-sensitive proteins found in the photoreceptors of the eye, among other places in nature. Oesterhelt's opsin was from a single-celled bacteria that lives in highly saline lakes in Egypt and Kenya, and survives its harsh environment by converting light into energy. Oesterhelt's discovery prompted a wave of research in labs around the world, but no one supposed that genes from a single-celled bacteria could be transported across billions of years of evolution to function in a mammalian brain. "There is so much that is different about microbial cells and our cells," Deisseroth says. "Their whole inner workings are different—how they shuttle proteins from one spot to another, how they store things, package them, send them to the surface of the cell."

In 2002, Gero Miesenböck, at Memorial Sloan Kettering Cancer Center, in New York, became the first researcher to use an opsin to render a brain cell light-sensitive. He used an opsin taken from the retina of a fruit fly. Miesenböck is considered one of the fathers of optogenetics, and in 2013 he shared a major award, the Brain Prize, with Deisseroth and several others. The fruit-fly opsin required three proteins acting together to get the treated cell to fire. To adapt the experiment to a living animal's brain would mean importing the genetic code for each of the signalling proteins—an unwieldy task.

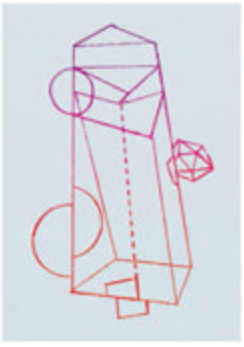
In 2003, a group of German researchers announced the discovery of a new microbial opsin, derived from a green algae that grows in ponds. When introduced into human embryonic kidney cells, the opsin made the cells respond to flashes of blue light. Deisseroth recognized the discovery as being potentially revolutionary. Unlike the fruit-fly opsin, the new opsin—channelrhodopsin-2, or ChR2—converted light into electricity in a single step, at virtually the speed of electrical impulses in the brain.

For a few years, Deisseroth had been thinking about using opsins to make neurons in a living animal sensitive to light, but he stresses that he was not the only person who had that idea; he brainstormed with others at Stanford, including a graduate student named Ed Boyden. There was every likelihood that it would be impossible in brain cells, which are far more complex and fragile than the kidney cells that the German team used. "For many scientists, the risk of wasting time and money was too great," Deisseroth says.

In the summer of 2004, Deisseroth opened his own lab at Stanford, and hired a brilliant Ph.D. student named Feng Zhang, who in his teens had worked in a gene-therapy lab. Zhang seemed like the ideal person to do the delicate work of introducing the pond-scum opsin into a brain cell. The opsin would have to be smuggled into the cell using a virus, but at a concentration that would not kill

the neuron. Deisseroth told Zhang that the experiments could be transformative. "He even mentioned something like 'This is one of those things that only come around every five or ten years,'" Zhang recalls.

Deisseroth's lab isolated a rat neuron in a petri dish, and Zhang chose a benign lentivirus to introduce the opsin into the cell. Deisseroth enlisted Ed Boyden to run tests on the treated cell. When Boyden flashed blue light on the culture, the cell produced strong action potentials—the spikes in electrical activity that neurons use to communicate. After a year of experiments, the team had created the world's first reliable technology for generating light-sensitive neurons that signalled at the speed of the brain.



But Deisseroth's excitement was tempered. He says, "It wasn't clear that this would work for what I really cared about—not just a toy experiment in a dish but actually controlling behavior in a living animal in a way that could teach us about what the brain is really doing." Indeed, when the team submitted a paper announcing its results to *Science* and to *Nature*, both journals praised the experiment's ingenuity but saw no practical application, and rejected it. When the paper was eventually published, in *Nature Neuroscience*, in August, 2005, the scientific community was uncertain that the technique could ever be made to work in a living animal.

The doubts only motivated Deisseroth. "I felt a sort of personal need to see what was possible," he says. Malenka told me that this understates the case considerably: "There's this drive of, like, 'You think I'm wrong about this, motherfucker? I'm going to show you I was right.'" Deisseroth began working furiously. "He was getting up at 4 or 5 A.M. and going to bed at one or two," Monje says. He kept up this schedule for five years, until optogenetic experiments began working smoothly. "There are people who don't need as much sleep," Monje says. "Karl is not one of those people. He's just that driven."

Deisseroth and his colleagues faced a series of challenges. They struggled to target the opsins to specific brain cells—those associated with, say, sleep or memory or anxiety. Finally, they devised a means for attaching small bits of DNA to the opsins, which acted like a password, insuring that they would be produced only in the correct cells. Then they had to figure out a way to deliver flashes of light to regions deep inside the brain, and settled on a fibre-optic wire attached to a laser diode. In late 2005, they began preliminary tests to see if they could control behavior in mice. In the first experiments, on cells in the hypothalamus—a region involved in sleep—they coaxed the animals to sleep in a dark room, then flashed blue light deep inside their brains. The mice woke—sort of. "It was a very subtle change," Zhang says. "The animal would twitch, then fall back to sleep." This was hardly the dramatic response they had hoped for.

Deisseroth's next scientific advance was the result of a publicity stunt. As word of what was going on in his lab spread, a *Times* reporter requested a visit in the summer of 2007. "Karl asked if I could come up with something interesting to show the reporter," Zhang told me. "I said, 'Maybe I can stimulate the motor cortex and cause the mouse to shake, or something.'" Deisseroth showed me a video that re-created the experiment. A mouse—apparently normal, except for a small tube emerging from the top of its head, where the fibre-optic wire is implanted—is filmed from above, standing on its hind legs and sniffing at the side of its enclosure. The instant that a blue glow appears, the mouse begins to run in wide circles to the left. (The fibre-optic wire was shining light on the motor neurons on the right side of the brain, which control movement on the left side of the body.) The instant the light is shut off, the mouse stops running and resumes its sniffing. It's clear that the behavior was not a pain response, since the brain has no pain receptors. By stimulating the motor cortex with light, Deisseroth had turned a freely moving animal into something close to a video-game avatar controlled with a joystick. "That's really the moment we knew that it could drive very, very robust behavior," Zhang says. "I went to grab Karl, and he said, 'This is what we should show the reporter.'"

The reporter was impressed enough to feature the experiment in her article. But it was another two years before Deisseroth and other researchers demonstrated that optogenetics could be more than what the *Times* had called a "science-fiction version of stupid pet tricks." In the spring of 2009, Deisseroth's graduate student Viviana Gradinaru published a paper about using optogenetic manipulation in rodents to define precise neural connections in Parkinson's disease. Shortly after that, Zhang co-authored an article in *Science* that examined the role that highly specific dopamine neurons play in feelings of reward—results that had special significance for drug addiction. Two papers in *Nature* showed the role of cells in brain activity related to schizophrenia and autism. The papers appeared in quick succession. "That was all people needed," Deisseroth told me. "The world ran with it."

Scientists wrote to request clones of the opsins to use in their own experiments, and, in the years since, bioengineering subspecialties in the design and development of new opsins have sprung up. Ed Boyden, who left Stanford to launch his own lab, at M.I.T., had already shown that, under flashes of yellow light, the photosensitive protein in the original bacteria that Oesterhelt found in Africa could produce an electrical current that turns off neuronal activity. By using it in concert with the blue-light opsin, researchers can play neural circuitry like an organ, turning brain activity on and off at the actual speed with which neurons communicate with one another—a process, Deisseroth says, that has brought extraordinary control to experiments designed to determine how the brain processes information and drives behavior. By dye-staining cells with proteins that glow fluorescent when neurons fire, researchers

can not only "play in" behaviors, by stimulating optogenetically treated brain cells with the fibre-optic light flashes, but also "read out" the circuit activity triggered when a lab animal is put through certain tasks.

Gary Lynch, a professor of psychiatry and human behavior at the University of California, Irvine, and an expert on memory, says that optogenetics has become an indispensable tool in neuroscience. "The tremendous power is that it lets you take specific populations of neurons that are mixed up with other kinds of neurons and stimulate the type you want to stimulate"—as in some parts of the amygdala, where neurons relevant to emotion, memory, and sociability intermingle. The problem with previous experiments on the amygdala, Lynch says, is that "when you stimulated it with electrodes and you got effects, you didn't know if it was because of this population or that population of neurons."

Lynch says that he recently began optogenetic experiments on the hippocampus, a deep-brain structure, crucial to narrative memory, that was especially difficult to study with the old methods, because of the myriad neurochemical "inputs" from other parts of the brain. "For years, I and others have been trying to understand what these different inputs do to the hippocampus—what are they adding?" he says. "Short of using drugs and electrical stimulation and painfully teasing it out, we find it very, very difficult to get a good answer." Optogenetics, however, offers an ideal way to pinpoint the neurons in those inputs, turn them on and off, and note the effect that doing so has on memory. The research, he says, could have implications for the tailoring of drugs used to alleviate Alzheimer's.

Deisseroth estimates that optogenetics is now being used in more than a thousand laboratories worldwide, and he takes twenty minutes every Monday morning to sift through written requests for the opsins. It was not until Monje joined her husband at a recent neuroscience conference in Washington, D.C., that she understood the fame that optogenetics had brought him. "People were stopping us at the airport asking to take a picture with him, asking for autographs," she said. "He can't walk through the conference hall—there's a mob. It's like Beatlemania. I realized, I'm married to a Beatle. The *nerdy* Beatle."

Stanford is known for the scarcity of its lab space, but in 2012, as Deisseroth was wooed by rival institutions, the university offered him a dedicated research facility in the hills above Palo Alto. A sleek white structure that he calls the Cracking the Neural Code Building, it once housed a biotech company. The lobby is dominated by a twisting central staircase, like a strand of DNA, linking two floors filled with laboratories, animal surgeries, and offices, where thirty-five students work under Deisseroth's direction.

In one recent experiment, he investigated a major symptom of depression: the inability to take pleasure in formerly enjoyable activities. Mice strongly prefer sugar water to regular water, but after a few weeks of what Deisseroth calls "mild, non-painful stress" they no longer cared whether the water had sugar in it. By examining brain pathways of mice that have been subjected to the stress, Deisseroth traced the specific neural connections that relate to their apathy, isolating the relevant cells and connections. Because we share with rodents many of the protein markers that define those pathways, it is hoped that drugs tailored to those circuits will eliminate the symptoms with an exactitude not previously possible. "That's the direction that clinical psychiatry is going anyway—to more of a symptom-focussed treatment,"



"Yes, I was asleep. But it was a vigilant sleep."



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Deisseroth told me. Many psychiatrists expect that drugs aimed at alleviating the blanket disease of depression—like Prozac—will increasingly give way to drugs that target precise symptoms, such as anxiety, that occur in multiple disorders. "It matters less which exact disease category someone falls into," he added. "What matters more is, What are the symptoms and what are the medications that help with those symptoms?"

It's possible that optogenetics could be used as a therapeutic tool in humans, and Deisseroth has been given grants aimed at that outcome. With those grants, he has performed experiments to control the differentiation of embryonic stem cells, with the idea of one day developing optogenetics for the treatment of organic brain disorders. He published several papers on the subject in 2010. "A lot of people have followed that up," he told me, but he has moved on, and is currently focussed on the basic science of the brain, where "the opportunities dwarf everything else in terms of impact." Some scientists have imagined treatments evocative of Delgado's stimoceiver: implanted L.E.D.s that flash light deep into the brain to quiet anxiety symptoms or, in schizophrenics, hallucinations. Deisseroth warns that such therapies face considerable hurdles, owing to the unknown effects of injecting viruses into the brains of living patients. But, he told me, some clinicians are already looking at possible treatments in the peripheral nervous system—the nerves that go to the arms and legs. "If you could turn down the pain fibres without affecting movement or the normal sensations, then we'd have a big impact," he said.

Botond Roska, a neuroscientist in Basel, and Jose-Alain Sahel, an ophthalmologist in Paris, are working with optogenetics to restore sight in the blind. Early tests have been successful in mice and primates. "We also did it in human retinas that had been kept alive from organ donors," Roska says. "It's another way we know that our vectors will probably work in human subjects." They hope to run the first human trials in the next year or two.

Deisseroth, meanwhile, also adapts knowledge gained from his optogenetic experiments to use on the patients in his clinical practice. At a recent therapy session, he met with a tall, courtly man in his seventies, who suffers from severe depression associated with Parkinson's disease. I will call him Henry. As Deisseroth worked with Henry, he thought about his studies in mice, which showed a correlation between depression-like states and a dearth of dopamine-producing neurons. A year earlier, he had prescribed for Henry a pill that acts on the dopamine system. "Agents that act just on the dopamine system are very rarely given in depression," he told me. "But it has been really good for him." In the session, Henry described a significant improvement in his outlook. Before beginning the drug regimen, he had been unable to summon the will to walk across the room; lately, he had been stretching every morning. He told Deisseroth, "I'm not looking backward at things, so I'm shaded to the positive."

At the end of the session, Henry described the worst depths of his depression, saying that everything could fill him with hopelessness and dread. "It could be an object," he said, pointing at the desk. "Like that piece of paper. It bothers me in some unimaginable fashion."

Deisseroth, who had been typing notes on his laptop, looked up. "That's a great phrase," he said. "Just looking at an object and it making you feel bad. I've never heard any patient say that. That's a great, crystalline description of how it just touches everything: perception, action, and feeling."

Later, when we were driving back to the lab, I asked Deisseroth about his excited reaction. Did Henry's phrase interest him as a writer, or was it useful to him as a scientist? "That's very usable," Deisseroth said. "I can think about doing experiments in animals now with that. For example, by using optogenetics to turn down the dopamine neurons, can I make an animal feel aversive toward a formerly neutral object?" He pulled up in front of the building. "I could go in right now and tell a student, 'Hey, do that experiment.'"

One day in early 2010, Deisseroth was in his office, enjoying a few minutes of peace. Optogenetics was finally working as he'd hoped. His phone was on mute. He was getting no disruption from his motor cortex.

He had been thinking about one of the most vexing problems in neuroscience: how to create a detailed image of all the brain's neurons and their interconnections. X-rays and other techniques that use light to penetrate the tissues don't work, because of the brain's high volume of fats and water, which cause light to disperse. For years, neuroscientists had resorted to slicing cadaver brains into razor-thin sheets, scanning them, then putting the sections back together, trying to realign the nerve fibres, many of which had been damaged by being cut into layers. "You basically can't do it," Deisseroth says. "You can only do very local, small-scale anatomy." Removing the fats and the water was considered impossible, since they make up the "aspic" that holds the delicate network of neurons and axons in place.

Monje recalls her first hint that her husband was working on a new project, which came while they were changing a diaper together. Deisseroth said something about how great it would be if one could render a brain completely transparent. By then, she knew enough not to dismiss such a notion. "I thought, He'll probably figure out how to do it," she said. In his office, Deisseroth wondered if he could displace the fats and the water with a scaffold that would support the wiring but allow light to penetrate—perhaps a hydrogel, a water-based polymer used to support cells in human-tissue repair. He opened a spiral-bound notebook and began to fill pages with words and sketches, ideas for what he called an "endoskeleton" that would "digest away" the fats and the water. "The resulting structure can be studied in unprecedented detail," he wrote. The idea became CLARITY, an acronym for "Clear Lipid-exchanged Anatomically Rigid Imaging/immunostaining-compatible Tissue hYdrogel." CLARITY is Deisseroth's second great contribution to neuroscience—a method for rendering cadaver brains completely transparent, save for the perfectly intact cells and nerve fibres.

Unlike optogenetics, the idea progressed rapidly to practical use. Deisseroth hired a chemical engineer named Kwanghun Chung, and within a few months they were experimenting with a hydrogel called acrylamide. They injected the acrylamide as a liquid into the tissues, then soaked the brain in warm water, which caused the liquid to turn into a gel. By running a gentle electrical current through the tissues, they drove the fats out, leaving the neural circuitry suspended in the clear hydrogel, and rendering the brain "transparent."

In April, 2013, Deisseroth announced the new technology in *Nature;* the journal's Web site posted videos of a clarified mouse brain, showing a tangle of fantastically fine cells and nerve fibres, which glowed green against a black background. Thomas Insel, the director of the National Institute of Mental Health, called it "probably one of the most important advances for doing neuroanatomy in decades." It has since become a standard tool for scientists and clinicians around the world. Recently published studies using CLARITY have provided fresh insight into the buildup of deposits in the brains of people with Alzheimer's. Monje uses CLARITY to study tumors from the particularly invidious form of pediatric brain cancer that she specializes in. The technology has been adopted as a critical tool for a project, endorsed by the BRAIN Initiative, to make a complete map of a mouse's brain and, perhaps eventually, the human brain—an enormous undertaking, on the scale of the Human Genome Project, in which researchers will plot and categorize the nearly hundred billion neurons and the hundred trillion connections among them.

On the day I visited Deisseroth's research building, he walked me through labs where mouse brains were being clarified. Small test tubes, wrapped in foil, stood in racks on motorized, lightly heated platforms that rocked them continuously in a circular motion. He took one of the tubes and peeled away the foil. At the bottom was a small, pinkish, semi-transparent lump floating in cloudy liquid. A fully clarified brain would be nearly invisible to the naked eye.

For decades, researchers have imagined the brain as a soup of neurochemicals whose normal functioning depends on those chemicals remaining in proper balance. Mental illnesses were believed to result from a "chemical imbalance"—the wrong amount of this or that neurotransmitter in certain synapses. Limitations to that approach were becoming obvious even before the advent of optogenetics and CLARITY. "If you say, 'There's some such thing as a serotonin deficiency in depression,' then anything you do that specifically increased serotonin would be an antidepressant," Deisseroth told me. "But it's not true. So you can't explain things at that level. Likewise for psychosis, or schizophrenia. Some things fit chemical patterns, others don't."

Increasingly, neuroscientists believe that the key to understanding how the brain works lies in its over-all neural circuitry, and the way that widely separated brain regions communicate through the long-range projection of nerve fibres. In this view, mental disorders result from the shorting-out or disruption of the larger circuit wiring of the brain—and it is in defining and describing those circuit connections that Deisseroth's innovations promise to be especially helpful.

Christof Koch, at the Allen Institute, likens Deisseroth to Galileo, whose early improvements of the telescope afforded a huge advance in our understanding of the cosmos. Even so, like Galileo's telescope, which opened up the immensity of space, Deisseroth's technologies have helped reveal how little we know about the brain—what Koch calls "by far the most complex piece of organized matter in the known universe."

Koch says, "Over the past four hundred years, since the discovery of the telescope, each successive generation of astrophysicists has realized that the universe is still bigger than the previous generation thought. So it is with the brain. Each generation of neuroscientists turns up more complexity, more hidden layers."

Deisseroth told me that he is no closer to understanding the greater mystery of the mind: how a poem or a piece of music can elicit emotions from a mass of neurons and circuits suspended in fats and water. "Those are all incredibly important questions," he said. "It's just too early to ask them." ♦



SO YOU'RE JUST WHAT, GONE?

Justin Taylor

PHOTOGRAPH BY BRIAN FINKE

It's one of those airlines where you get your seat assignment at the gate, and they're late to Logan and slow to get through security, so the lady at the counter can't seat Charity and her mom together. Which means five-plus hours of freedom—hallelujah! Nonetheless, she pouts about having to sit with a *total stranger*, all because her mom was a spaz about the body scanner and they had to wait while a female agent was summoned to conduct a pat-down. Charity went through the scanner without protest, hands up like a criminal—it was kind of fun—standing in her sock feet in the chamber. She hustled out, in order to catch a glimpse of the agent's screen, hoping to see her own skeleton, though she knew it wouldn't be there. This wasn't like X-rays at the doctor. What she saw was herself simplified to an outline: an empty female shape imposed over a green-gray field.

"There's more radiation in our phones, I bet," Charity says, still not quite ready to let the issue drop. She doesn't want to go to Seattle and visit Grams. Missing a week of school is cool, in theory, but her A.P. English teacher has assigned her a stupid compare-and-contrast about "A Tale of Two Cities," to make up for the classes she'll miss. Between that and a sheaf of Algebra 2 worksheets, she doesn't see how she's coming out ahead. She's almost sixteen; why couldn't she just have stayed home?

Outside, men in orange vests and earmuffs and yellow knit gloves pull bags from the back of a flatbed trailer and chuck them into the guts of the plane. It's drizzling, the dark tarmac streaky with reflections of pinkish guide lights. Six-thirty in the morning and they've been up since four.

Charity's seat turns out to be twenty rows in front of her mom's: another miracle. "Try to get some sleep, Sweetie," her mom says, working a piece of Nicorette free from its blister pack as she kisses her daughter's cheek.

"I'm gonna do whatever I'm gonna do," she says. Case in point: she was up till almost one last night, Gchatting with her best friend, Lexie, and messing around on YouTube, trading links to cheesy nineties music videos and gross-out clips from medical reality shows.

Charity is stuck in the middle seat. The window seat is occupied by a fat woman wearing a gray sweatshirt that says "Hawaii" in knobby grapefruit-colored letters, her fingernails painted to match, which Charity can see clearly, because the woman's hands are pressed together in front of her. Head bowed and lips moving in silent prayer. Charity sits down in the empty aisle seat and begins her own prayer—that nobody will come, even though they keep announcing over the thing that the flight is full, no upgrades available, check rolling bags at the gate.

When the guy appears, he's older, way older—like thirty, maybe. He wears leather sandals and a powder-blue slim-cut dress shirt, untucked and with the sleeves rolled. When he lifts his black backpack up into the overhead compartment, Charity finds herself staring straight into his exposed navel, a bulging outie like a blind gold eye in his belly, which was waxed at some point and is now stubbled, like a face. The top of his boxers peeks up above the waist of what Charity just so happens to recognize as three-hundred-dollar True Religion jeans.

"Keeping my seat warm for me?" he says. She mumbles a few words, any one of which might be "Sorry," and heaves herself and her satchel-purse and her water bottle over to where she belongs, only to realize—*idiot*—that she's left her shoes under the guy's seat and has to ask him to move so she can get them. He gives her a tight obliging smile and half-shifts his legs, kind of miming the concept of "getting out of the way" while still being in it. She has to reach between his ankles to grab her All Stars, which he could've just handed to her, though in fairness to him if the situation were reversed she wouldn't touch his shoes for anything. Those grody sandals. Guh. He has hairy feet and narrow toes.

She digs around in her bag and takes out "A Tale of Two Cities," but she isn't allowed to put the tray down yet and the book is heavy and the canned air is making her chilly. Ah, screw it. She'll close her eyes through the boring stuff: flight safety, weather update, taxiing, and then the liftoff rush.

Her eyes flutter open and she sees an attendant going around offering complimentary newspapers. Aisle Guy grabs a *Financial Times*. He frowns at it, then turns to Charity and grins at her, a dadlike grin, crinkles blossoming around his mouth and eyes. "What do you think the odds are of finding anything in here I care about?" he says.

"What?" she says. "I don't . . ." His eyes are a washed-out green. The world feels crude and unfocussed, a bad sketch of itself. And she was wrong a moment earlier: he does not look like anyone's dad.

"The future of the rupee," he says, laughing—to himself? At her? "Interest rates. Taiwan." But then, as abruptly as he's engaged her, a headline in the paper catches his interest and he disappears behind the salmon curtain, leaving her alone with Fat Hawaii, who stinks of sweat and is studying *SkyMall* like it's the lost fifth Gospel. "A Tale of Two Cities" is still splayed open in Charity's lap. She shoves it into the seat-back pocket, half hoping she'll forget it there. She reclines her seat its measly inch and closes her eyes again.

She wakes some time later to sunlight on her face: Fat Hawaii's window shade is up, and her vision is a sea of burnt orange, with swimmers of emerald and gold. At some point she must've slumped over—she can feel the armrest she shares with Aisle Guy digging into her ribs. He has his tray table down: empty Styrofoam cup, two crumpled pretzel bags, and a pile of documents, the pink newspaper beneath. He's leafing through the documents with his left hand, so as not to disturb her, since she's leaning on his right side. Her head, she's coming to realize, is on his shoulder, like you'd do with a boyfriend or something. Her neck is cricked and her breast is squished against his bicep and she can feel his heat, can smell his cologne or soap or deodorant or whatever it is—

Charity jolts herself upright.

"Hey there, sleepyhead," he says.

"Can I, like, get out?" she says, her throat parched, her voice a whisper. Did she sleep with her mouth open? Christ, what if she'd snored—or *drooled*?

Aisle Guy starts to do the leg-twist thing but then, thinking better of it, stands and steps into the aisle, but forward instead of backward, so he's still in her way, and they have to shimmy past each other. She walks to the lavatory on unsteady legs, feeling watched by every

passenger as she makes her half-stumbling progress, pins and needles singing hotly in her feet.

There's no question of going back to sleep, so she reads for a while. But she can't keep Charles Darnay and Sydney Carton straight, and what does it matter? She has all week. She had planned to buy Wi-Fi for the flight but she slept so long it isn't worth it now, plus she'd have to go to the back of the plane and ask her mom for the credit card. Eff that. She takes her phone and earbuds out of her bag and puts some music on. Thumbs whateverly at Candy Crush while she listens.

But *of course* at the exact moment that the captain announces the initial descent Fat Hawaii says she needs to use the bathroom. Charity and Aisle Guy both have to get up. This time, at least, he stands in the right place and there's room for everyone.

"You live in Seattle?" he asks as they sit down. She has one earbud back in and the other waiting in her hand.

"No, I'm visiting Grams—my grandmother. Me and my mom are. For, like, a week."

"I'm on the road," he says. "Boston, Seattle, then Dallas. This whole month."

"O.K.," Charity says, but then, feeling vaguely like she owes him, summons up a modicum of pity, clears her throat, and asks him about his job.

"Oh, it's boring. I don't know if they teach you this in school, but boredom is where money comes from. You plant boredom and money grows."

"Dude, if that was true I'd be rich as hell."

"You get bored, do you?"

She laughs—almost snorts. "Uh, *yeah*. They make all these movies about high school being whatever but then it's just like—*school*. You know?"

"I'm Mark," he says. "What's your name?"

"Charity."

"Charity. That's pretty."

She can feel her cheeks warming. "I don't know."

"No, really. It is. You are."

"O.K. I mean, thank you. Thanks."

Mark reaches into his shirt pocket and produces a cream-colored rectangle and an expensive-looking pen. There's a name and a title and an e-mail address and some logo printed on the front side—it does in fact look boring as hell—but then he flips it over. On the reverse side, he scribbles a phone number and a pair of words. His handwriting is crowded but precise. "This is my cell and where I'm staying," he says, reaching across her lap to slip the card between the pages of "A Tale of Two Cities." He pushes it all the way in until it disappears.

Mark moves his hand away from the book, and Charity thinks he might fake-accidentally brush her breast, the way boys at school sometimes do. But Mark is not a schoolboy and instead palms her inner thigh and squeezes it, two pumps, the second one a hard one, his wrist digging against the crotch of her jeans.

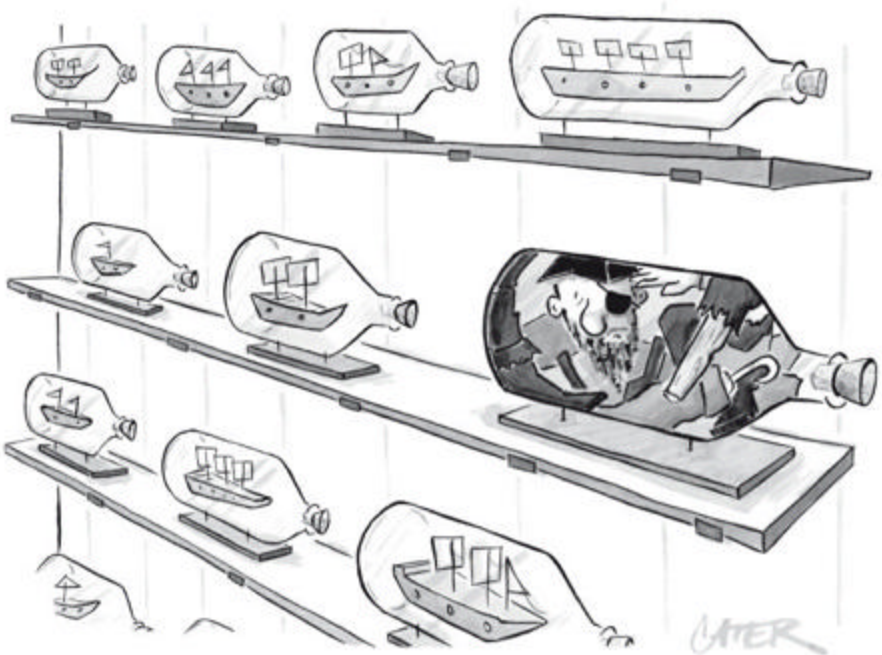
"Call me when you get bored, Charity," he says. His pretzel breath hot on her cheek. Then Fat Hawaii is back and he stands to greet her and Charity has no choice but to follow suit.

He ignores her for the rest of the flight, busying himself with his papers. Fat Hawaii prays loudly as the world rushes close out the window, then applauds when the plane touches down safely.

As soon as they finish taxiing, Mark unbuckles his seat belt and steps into the aisle. He gets his bag down and holds it in front of him and looks straight ahead. In the terminal, he takes hurried strides, and the crowds swallow him. When her mom emerges, finally, they ask each other how the flight was and both say it was fine.

"Did you sleep?" her mom asks.

"No," Charity says. "A little. You don't need to worry about me." She starts walking. They make their way through the teeming hall.



Charity establishes herself in Grams's basement; it's only lightly finished, and the foldout cot isn't super comfortable, but it beats sharing the guest room with her mom. The main thing is to avoid having to deal with anybody, which turns out to be easier than she thought it would be. After a couple of days she's kind of stir-crazy. When she isn't slogging through "A Tale of Two Cities," she keeps her earbuds in and texts with Lexie, or sometimes with Evan, who's this boy from school. She's hung out with Evan a few times, and once, at a party, in an upstairs bathroom, let him get to second base. Under the shirt but over the bra. But lately this girl, Jenna, who goes to private school, is all over his Instagram. Not like *in* pictures with him, just hearting every single post and sometimes leaving "first!" as a comment, which for Jenna's own sake Charity hopes is irony, but who can say. Lexie thinks Evan is a loser, which yeah maybe, but he's funny and easy to be around, so if he texts her she usually texts him back, sometimes right away and sometimes after waiting some random amount of time. And sometimes, like right now, she texts him first. "My grams is losing it. All she does is clean the same

clean shit. She's like bleaching bleach."

It's three hours later in Boston. Last period at school, which for Evan is study hall, so he's either doodling in his notebook or messing around on his phone under the table, the latter, probably, since he texts her right back: "Whoa harsh." Charity can't tell if he means that what she's dealing with is harsh or if she herself is being harsh, so she parries with a nonsensical string of emoji: a crystal ball, a party horn, four or five roosters, a smirking moon.

The main mission of this trip is to see how bad things have got with Grams, and to try to figure out what should happen next. To get a sense of—and maybe some control over—Grams's finances: bank accounts; stocks and bonds, if there are any; plus of course the mortgage and will situations. This would be slow going even if Grams, a fiercely independent woman, were at her best. Now that she's forgetting stuff, she covers for her lapses with a viciousness that makes people scared to deal with her. Which is the point.

Charity is used to seeing Grams once or twice a year—Christmas in Boston, maybe a weeklong visit to Seattle in the summer or over spring break. But Grams has mostly stopped travelling and, come to think of it, this is the first time they've made it out to see her in two or three years. Life is busy and money's always tight and time gets away from you. That's what her mom says. And that the important thing is they're here now: spending quality time, getting the lay of the land. Charity's scared that Grams might need to come live with them. She is an only child and doesn't think that she can learn to share her space with someone who, while obviously the opposite of a child, will increasingly have a child's needs and make a child's demands. She hopes Grams can go live with Aunt Jan and Uncle Dennis in Florida. They have a big house all to themselves, since Kyle is away at college. Or maybe Grams will want to stay in Seattle and they'll put her in a nursing home, though how would they pay for it and when would they ever visit her? The whole thing, when Charity tries to think about it, gets overwhelming really fast. She pushes it into a far corner of her mind and leaves it there, like how when she was a kid sometimes she'd want to help her mom clean the house but then get distracted between the broom part and the dustpan part, so the hair balls and dead bugs and other crud ended up heaped and forgotten in this nasty little pile in the corner, to be dealt with later—or else not.

No further word from Evan. She puts her phone down and goes upstairs.

Charity's mom is going stir-crazy, too, apparently, because she suggests that they all head downtown and do some sightseeing. Grams has "The View" going at top volume on all the TVs: living room, bedroom, and the little countertop one in the kitchen, where she stands in her nightgown, plunging a mop into a bucket of hot water. Charity's mom points out that the kitchen is spotless; the whole house is. "It may seem that way to *you*," Grams says, "but *some* of us have different *standards*." She hits the key words as though they were posts she's driving into the ground. She means to raise a high, strong fence around herself and then cower inside it alone.

"Will she be O.K.?" Charity asks as they get into Grams's car, which Grams never drives anymore. The engine sputters to life as if roused from a long but restless sleep.

"She's made it this far," her mom says. "The more immediate question is whether *I'm* going to be O.K."

"We," Charity says.

"Oh, Sweetie," her mom says. "Don't be dramatic. Of course you're going to be O.K."

After the Space Needle they go to Pike Place, where Charity takes a picture of her mom taking a picture of a group of Asian tourists who are taking turns posing for pictures in front of the original Starbucks. She texts the picture to Lexie and then separately to Evan. She makes her mom buy her a smoothie from a juice stall and they walk over to a little park to share it, but they can't find a spot far enough away from the homeless people so they go back to the market and shuffle up and down the row of stalls.

Charity wants to go to the aquarium, which is right down the block. They even talked about it earlier, but now her mom doesn't want to. She's doing that thing Charity hates, where she pretends to weigh options when really her mind is already made up. "I dunno, Sweetie. Probably we should get back to Grams sooner than later, don't you think. Maybe let's give it a shot another day, 'kay." Questions that don't end in question marks—this means they're never going to the aquarium.

"Whatever," Charity says.

They walk back to the car on a different street from the one they came down. Charity, lost in sulky reverie, keeps her eyes on her shoes and the black-gummed sidewalk as they make their way up a steep hill that she is pleased to notice leaves her mom short of breath. At the top, waiting for a light to change, Charity looks up and is utterly shocked to see, on the façade of a building kitty-corner from where she stands, the words Mark wrote on his card, tall and cut from metal and brightly lit.

She has meant to tell Lexie about Mark, has *almost* told her a few times, but then at the last second held back. Sharing her secret with her best friend would be fun in one way, but keeping it to herself—making it really her secret—is fun in a different way, at least for now. Besides, what if the story isn't over yet? She'd rather tell it all when she gets home and can enjoy the pink shock flushing across Lexie's face.

He did what? *And what did* you *do*? *Holy* fuck, *Char*.

Grams goes to bed after dinner and her mom isn't long in following. Charity finds Mark's card in her book. She punches his number into her phone but doesn't hit Call. She stares at the digits glowing black and thin in the iPhone font. She presses Create New Contact and saves him as "Mark Perv." She googles his area code: Phoenix. This tells her nothing. She could look up his company, but who cares? She maps his hotel and looks at the route suggestions. She scrolls through some photos of sample rooms. This is stupid. She sends Mark Perv a text that says, "Hey dude its charity from the plane"

She reads her book for a while, relishing being the last person awake in the house. When this small but definitive luxury has spent itself she changes into terry-cloth shorts and a T-shirt and

pads upstairs to the bathroom to brush her teeth.

As she's going back down, she sees an angelic haze rising through the darkness and knows that it must be her phone. Sure enough, there's a text from Mark Perv.

"So u bored?"

She's workshopping witty retorts when he texts again.

"Whatre you wearing?"

"Pajamas I guess, like a shirt"

"Bra?"

"Who sleeps in a bra?"

"U near me?"

"I'm in some suburb"

"Tell me where ur at I'll get a taxi"

"Can't cuz of my family"

"I'll pay for yours thats easy"

"Really can't … Maybe tmrw i dunno"

"Can i get a pic then?"

"What? No way!"

"Cmon sumthing to look fwd to ur teasing me bad here"

"Will u send one back?"

"Now were talking"

She lies down on the floor, knees in the air, as if preparing to do sit-ups. She's pleased with her thighs, smooth and blanched pale by the camera flash, but that's not enough, somehow, so she pulls her shirt up to show off her hip bones and the downslope of her abdomen, extends her legs into a pseudo-yoga pose, and tries again.

Her purple-painted toenails like weird stars in the grainy basement sky.

The picture, she thinks, looks like an American Apparel ad. Her shorts are blue with white piping, and, because of how she positioned herself, are taut around her crotch, the bulge of it clearly articulated and more than she'd intended to show. But it's less revealing than some American Apparel ads, which are in, like, magazines and on the sides of buses, so whatever. She sends the picture to Mark. He replies with a closeup of the head of his cock, its skin nubbled and flushed, a shiny pearl of semen in the opening, which Charity has never before had occasion to notice is vertical, like a vagina.

The tip of Mark's penis looks like a tiny vagina.

Charity puts her phone on silent and sticks it down at the bottom of her purse. She needs a minute to think, or rather to not think, about some choices she is somewhat pleased to now have, but does not necessarily want to make right away. *I'm gonna do whatever I'm gonna do*, she thinks, and takes out "A Tale of Two Cities," knowing she won't be able to concentrate on it, but trying to anyway. One word and then the next, like rungs on a ladder. Sentences, paragraphs, pages. The revolution happens and everyone has such high hopes but then it all gets terrible. She puts the book down at the end of a chapter and wills herself to sleep.

The next morning she checks her phone and sees that the battery died during the night. She plugs it in and goes upstairs. Back home Lexie and Evan are already at lunch. Charity feels outside of time and the world a little, which is scary but also cool, and if it's true then maybe things that happen here in this other time register differently, matter less—or more, which is also possible—on the, like, cosmic or whatever scale.

She finds Grams seated at the kitchen table and joins her. Grams is holding a slice of toasted Pepperidge Farm white bread over a china saucer. No coffee cup or coffee to be seen.

"So he's gone, then," Grams says, putting the toast down.

"Huh?"

"I guess you wouldn't be here if he wasn't. Well, I'm sorry for you, sorrier for the baby, but not half sorry to see the last of that piece of shit. And it will be the last, or pretty nearly. You'll be lucky if he sends Charity a birthday card, much less child support."

"Grams," she says. "*I'm* Charity."

Grams slams the heel of her hand on the table, sending the toast and the saucer crashing to the floor.

"*Moooooom*," Charity cries, her voice rising like a siren, sounding even to her own ears like that of a frightened child.

Her mom emerges, a few long seconds later, bleary and grumbling, from the guest room, and this seems to calm Grams; her lucidity returns like a dislocated joint pulled back into place. Charity, her eyes wet, walks across the kitchen. She pulls a paper towel off the roll and runs it under the faucet, then kneels to clean the shards of toast and china from the floor. Grams announces that she is going to her room to get dressed. It's well past time, she says, to start the day.

When the bedroom door closes, Charity's mom grabs the cordless phone from its wall-mounted cradle and starts making calls—the G.P. first, then the neurologist, and then Aunt Jan. Charity finishes cleaning up, then goes downstairs to recover her aloofness and get dressed, too.

When she gets back upstairs, Grams is still in her room, maybe hiding from them, while her mom sits at the kitchen table. There is a gray burst at the crown of her mom's head, and Charity knows that this is because her mom's regular appointment with the colorist had to be rescheduled. Because some things can be put off and others can't, or can't anymore.

Her mom's fingertips are at her temples, the cordless trapped between her ear and her shoulder as she stares down at a yellow scratch pad on which nothing is yet written. Charity says she wants to go downtown and see the aquarium. Her mom puts her hand over the mouthpiece of the phone; a pointless gesture, since she's on hold.

"Take two twenties from my purse. Check in in two hours. 'Kay?"

"Mom."

"Charity." They might have gone on like this, but then whoever has her mom on hold comes back on the line. The pen starts moving across the paper. Charity's sneakers are by the front door. As she laces and ties them, she thinks about going back into the kitchen, sitting down with her mom. She can almost see herself doing it. But she has her sliver of freedom to protect, a day of her own ahead of her.

"Love you," she calls out, then leaves without waiting for a reply.

On the light rail Charity has a whole bench to herself. She stretches her legs across the seats, then wriggles the phone out of her jeans pocket and turns it on. There are literally dozens of texts from Mark Perv waiting for her, which is both surprising and not. She expected something from him, had been perhaps

counting on something, but this is above and beyond. She scrolls up to the beginning and reads in order.

First he sent another shot of his junk, with the balls in it this time, then he asked for more pictures from Charity. His requests are super specific! They read like doctor's instructions—*open wide*—or the rules of some ridiculous game.

But, if this is a game, Charity thinks with rising indignation, Mark has cheated. They've barely begun playing and here he's gone and skipped all her turns.

His messages go from sweetly solicitous to powerfully angry, then back again. He accuses her of misleading him and calls her all sorts of names, then suddenly regains himself, tries to feign a degree of belated cool. He says he's sorry if he scared her or came on too strong; she can trust him. It's O.K.—really, honest—if she needs time to think. But also she's a stupid little bitch playing with fire and bound to get burned. He's going to fuck her ass so hard that when she goes back to the airport she'll need a wheelchair.

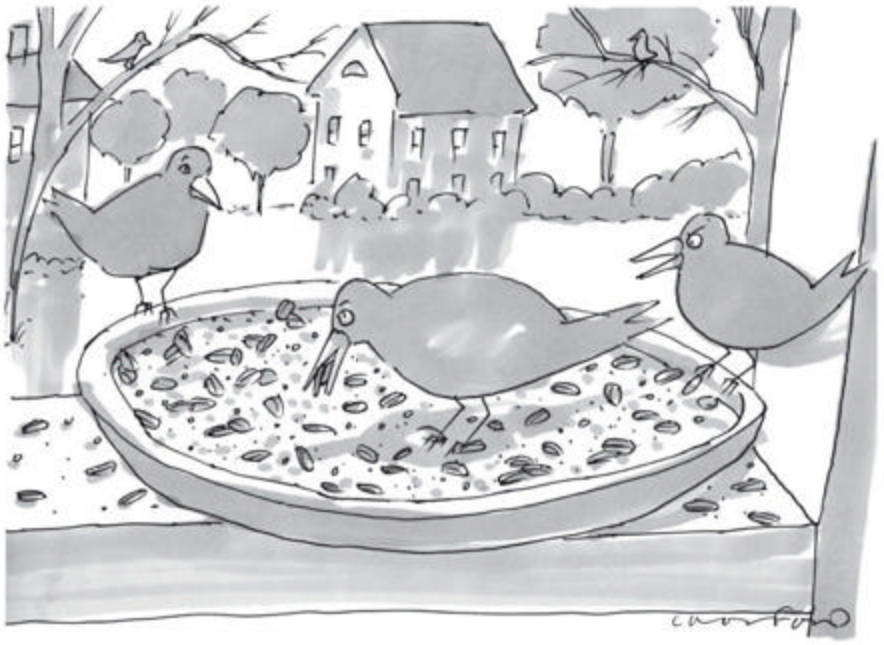
Jesus, she thinks. *Next he'll be offering to push the wheelchair.*

The last text, sent after a few hours' lapse, is time-stamped 5:57 A.M.

"So yr just what gone while im risk EVERTHING? so fuckin lame"

She imagines the thunder of Mark's blood in his ears as he harangued and pleaded. She wonders if he will hear that thunder again when his life comes crashing down around him—that is, if she reports him, which she knows she should. She knows the guidance-counsellor language for what is happening here. But ratting out Mark will mean telling the story, having to explain herself, over and over, to anyone who can make her tell it, cops and her mom, kids at school, after word gets out. Evan, for example, who, come to think of it, still hasn't texted her back. She thinks about texting him: *So you're just what, gone*?

The Mark thing will make so much less sense out loud than it did when she did it, or even than it does now as she goes over it in her head. That's the most unfair part. Everyone will have their own version of "What were you thinking?" and "Why did you do that?" Like her life is some book she needs to write a report about, identifying key themes and meaning, when, really, texting Mark was like peeking in the doorway of a bar or the teachers' lounge—someplace you could get in trouble for going into but were curious to glimpse the inside of, just to be able to say that you knew what was in there. And maybe someone had dared you to do it and maybe you had had to dare yourself.



"Hey, Jerky! You're standing in the middle of my entrée!"

• •

The aquarium is mobbed with schoolkids on a field trip, seven- and eight-year-olds in yellow polo shirts with a crest stitched over the breast. They stick their hands in the touch pools, stroking anemones, spiny urchins, and orange starfish you can see moving only if you look close. Gray stingrays, their venom removed, jockey for position as they take laps around a tank. Kids reach in to swipe at them as they go past.

When the tour guide calls the kids to attention and starts talking about the different kinds of sea life, Charity finds herself listening, following along as they make their way through the main hall to an outdoor pool, where some otters are playing in the sun.

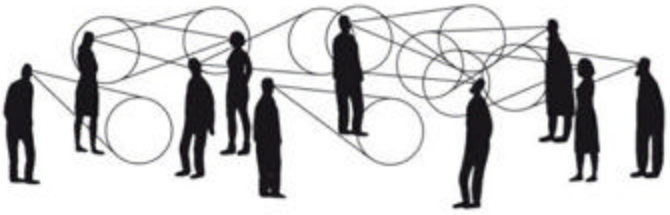
An employee emerges from a door in the back wall, carrying a bucket of cut-up fish. Charity figures he'll make the otters do tricks for pieces, but instead he takes the bucket in both hands and swings it. With her phone, she takes a perfect shot of the mass as it unfurls over the water in a hail of innards and scales.

She turns her back on the feasting otters, moves away from the kids. She opens her mouth as wide as it will go and retracts her tongue, like an eel in its lair. She puts the phone in her mouth, its glass face clicking against the back of her top front teeth, warm metal resting on her lower lip. She takes a picture. The roof of her mouth is a spidery pink dome. Below it, the curve of her tongue is a half-sunk moon casting a shadow into the gulp of her throat, above which her uvula hangs like a second moon, a full one, this alien world within her, shining like surgery. She pairs the two pictures together in a single Instagram post, no filters. She tags Lexie and Evan and some of their friends, plus private-school Jenna and, for good measure, a few total strangers who somehow or other found her feed and, for whatever reason, became her followers.

Fish gutz / my gutz: Compare & contrast. ♦

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Taylor on "So You're Just What, Gone?"



POP MUSIC

NEVER SETTLE

The shape-shifting methods of Shamir.

BY ANWEN CRAWFORD

Shamir Bailey, a twenty-year-old from Las Vegas, who performs as Shamir, has a high-pitched voice that has been compared to Michael Jackson's, though the closer comparison might be to that of the jazz singer Jimmy Scott, whose remarkable contralto seemed to float between genders. Shamir's singing voice is thinner than Scott's was, but, like Scott, when he sings he sounds both ageless and genderless. Shamir moves freely: his songs draw on the history of dance music, especially disco and house, without being burdened by it. His androgyny, while genuine, feels light in spirit.

Pop performers who look androgynous outnumber the sort who, like Shamir, really sound it. Shamir's voice also recalls that of Sylvester, the disco vocalist whose 1978 anthem "You Make Me Feel (Mighty Real)" sounds like a kiss-off to anyone who might try to pin him down. In a video for the song, footage of partying clubgoers is intercut with scenes of Sylvester dressed in costumes ranging from a crisp white suit to a sequinned turban and matching gown. Likewise, Shamir, in the clip for "On the Regular," a single that he released last October, appears in an assortment of outfits: a candy-colored shirt and silver sneakers, a fringed cowboy jacket, a black top that glitters beneath the light of a disco ball. Transformation lies at the heart of pop music's appeal (David Bowie has understood this better than anybody), and androgyny is a transformation both spectacular and unstable, never settling on one thing or another. The androgynous pop star can become anyone; by extension, so might the listener. "Hi hi howdy howdy hi hi," Shamir opens "On the Regular." "While everyone is minus you can call me multiply."

When Shamir sings his lyrics, his pacing is leisurely, but when he speaks them the tempo increases, and he sounds even younger than he is. "On the Regular" is like a schoolyard chant, delivered over an insistent kick drum and a bouncing cowbell. The song is the first single from Shamir's fine début album, "Ratchet," which comes out this month, and the sassiness of its lyrics is an exception on a record that sounds jubilant until you read the liner notes. "We've given up on all our dreams," Shamir sings, in "Make a Scene," which looks back on adolescent hedonism with a young adult's newfound weariness. The teen-agers may puke and party, but adulthood, too, is "one big mess." The track has a rubbery electronic bass line, and a handful of synthesizer notes that squeal like fireworks, but, as throughout "Ratchet," the arrangement is minimal, using not much more than programmed drums and synthesizers, and leaving plenty of room for Shamir's voice. Shamir has a diva's ability to draw you in, but also a diva's ability to keep you away from him, at a distance that he determines. "Don't try me, I'm not a free sample," he warns, in "On the Regular." "Step to me and you will be handled."

Shamir was brought up in the suburbs of North Las Vegas, and began playing music as a child. He taught himself guitar holding the instrument upside down, and he still plays that way. He grew up as a fan of country music, and he included a faithful cover of the Canadian singer-songwriter Lindi Ortega's "Lived and Died Alone" on his first EP, "Northtown," which was released last June. (He has also recorded a cover of the American country singer Miranda Lambert's "The House That Built Me.") The first three tracks on "Northtown" are constructed on the pulsing arrangements of drum machine and keyboard common to house music, but the Ortega cover, along with a ballad called "I'll Never Be Able to Love," draws out the basic sadness of the whole recording. "There was no way to move any faster / Because we stay stuck in one place, with nothing to do," Shamir sings, on "Sometimes a Man," while a single chord repeats. The video for "Sometimes a Man" tracks Shamir through various Las Vegas landscapes: a casino, a suburban street, a highway leading out across the Mojave Desert. The pull between celebration and isolation in Shamir's songs seems as much a result of his environment as of his voice: beyond the hectic revelry of the Las Vegas Strip lies the quietness of suburbia and, beyond that, the desert's unnerving solitude.

During his teens, Shamir and his friend Christina Thompson formed a duo called Anorexia. The two played pop songs loosely, with a punk attitude. In early 2013, Anorexia posted a short video to its Web site, described as a trailer for "the upcoming web series Ratchets." The shaky footage captures a young group of friends, dancing and goofily mucking around at home. Nothing more came of the Web series, but the word "ratchet," which is slang for "déclassé," and refers in particular to women, clearly has resonance for Shamir. Ratchet can be a compliment or an insult. "Feel like I'm right but always wrong," Shamir sings on "Hot Mess." "Hot mess" would be another way to describe someone who is "ratchet."

Shamir's peculiarity makes his music as vulnerable as it is strong. He has cited the rebel women of pop history—Billie

ABOVE: GUIDO SCARABOTTOLO

Shamir moves freely: his songs draw on the history of dance music, especially disco and house, without being burdened by it.



PHOTOGRAPH BY JEFF MINTON

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Holiday, Nina Simone, the British punk trio the Slits—as formative influences on his songwriting. (Sylvester wore gardenias in his hair as a tribute to Holiday; Shamir has done the same.) He also names Kurt Cobain and the outsider artist Daniel Johnston (a personal favorite of Cobain's) as being important to him. These are men who have laid bare their emotions in song; even when their lyrics are cryptic, their unique voices have exposed their feelings. Not that Shamir is particularly interested in perplexing his listeners. "Musically, it's a party," he told me of his album. "But, lyrically, it's like my diary."

Whatever Shamir does next will probably not sound quite like "Ratchet." His ease with inhabiting and then discarding musical styles, from punk and country to dance, seems, more than anything, a consequence of his being young at a time when all genres are equally available and equally interesting. He is too young to be truly nostalgic for genres that were past fashionable before he was born, so "Ratchet" uses house and disco conventions as a means rather than an end—musical scaffolding for his own lyrical insights. It seems likely that, when these conventions are no longer useful, he will move on. Meanwhile, together with the producer Nick Sylvester—who co-wrote eight of the songs on "Ratchet," and who released "Northtown" on his label, Godmode—Shamir has created pop songs that retain something of the make-do spirit of his teen-age experiments with Anorexia. Shamir's current label, XL, has advertised "Ratchet" with a billboard in Times Square; if that kind of real estate suggests the appearance of an imminent teen idol, then Shamir may be a more idiosyncratic teen idol than most.

In the video for "Call It Off," a single from "Ratchet," Shamir transforms from human to Muppet and back again. The effect is sweet and childlike, but it also feels generous, as if we, too, were being offered a space in which to become something, or someone, else. "Call It Off" is a breakup song that dwells on the pleasure of new possibilities—the verses are disdainful and the chorus feels ecstatic. The song layers two jaunty synth lines, one bass and one treble, over a simple four-four beat. "Like I'm the one who needed questioning," Shamir sings, waving his doubters goodbye. ♦

BOOKS

MIRROR STAGE

A memoir of working undercover for the Drug Enforcement Administration.

BY MALCOLM GLADWELL



The former D.E.A. agent Edward Follis describes his targets with awe and intimacy.

When Edward Follis was nineteen, he heard the Glenn Frey song "Smuggler's Blues" on the radio. Three lines stuck in his head:

> It's propping up the governments in
> Colombia and Peru
> You ask any DEA man,
> He'll say, "There's nothin' we can do . . ."

For weeks, he thought of little else. He talked about the song obsessively with his friends. Finally, he had a moment of clarity. As he recalls in his memoir, "The Dark Art: My Undercover Life in Narco-Terrorism" (Penguin/Gotham), written with Douglas Century, "I said to myself, *Fuck it. I'm gonna become that DEA man. Let 'em try to tell me there's nothing we can do.*"

Follis joined the Drug Enforcement Administration after a stint in the Marine Corps, and from the moment of his first bust—when he posed as a buyer for a group of Mexican heroin wholesalers—he was "hopelessly addicted to undercover." During the next three decades, he fought the drug war in Thailand, Mexico, and Korea, and rose to become the agency's chief representative in Afghanistan. The cast of characters he met along the way could populate a movie set. There was Dragan, "a young Rutger Hauer, six-one, close-cropped blond hair and cobalt-blue eyes," for whom the D.E.A. put together an entire warehouse of advanced weaponry in a drugs-for-arms deal. "His demeanor remained ice-cold," Follis writes:

> He didn't say shit. Didn't so much as nod. And he damn sure didn't smile. I don't think he was a white supremacist, but to me, he had an almost neo-Nazi appearance; he held your gaze for too long, and those blue eyes were chilling. I've learned with guys who look like that, guys who think they're badasses, you don't keep your distance from them. You move in *closer*.

Then, there was Kayed Berro, scion of the infamous Berro clan, from the Bekaa Valley, in Lebanon, and an alleged associate of the Pakistani heroin kingpin Muhammad Khan, who, Follis tells us, was widely feared and never seen, in the manner of "the Keyser Soze character in *The Usual Suspects*." In Thailand, Follis went in search of the elusive Khun Sa, the opium warlord known as the Prince of Death. Follis became so fluent in Thai that his Thai girlfriend once exclaimed, after listening to him set up a meeting with a trafficker, "When I listen to you speak, I wouldn't even know you were white." He hauled duffelbags stuffed with five hundred thousand dollars in small bills through a secret passageway under Hong Kong International Airport. He stared down an ex-con named Mike, who pointed an Uzi between his eyes, wondering if Follis was who he said he was. ("What are you talkin' about, Mike?" Follis fired back. "Think I'm a fuckin' cop or something? . . . How could I be a cop? Listen, man, *I'd* be in fuckin' jail for what I've done with you so far.") When one of his informers was grabbed in Kabul, he picked up an M4 carbine, a Glock, and a bowie knife, and took off through the city's streets in a scene worthy of the "Fast and Furious" franchise:

> "Haji up," I said. We threw on our UC garb: the white cotton tops of the *shalwar kameez*, black scarves around our faces, and two Massoud caps—tan-colored beret-like hats that were the favored headgear of the Lion of Panjshir himself. I was gunning the gas, on the *edge*, swerving the heavy armored Toyota as if I'd taken a straight shot of adrenaline. The streets of Kabul swarmed around us like a medieval bazaar. I had tunnel vision, oblivious to the thumping as the side mirrors of the Land Cruiser clipped pedestrians, knocking more than a few to the pavement. . . . Behind us, we heard angry shouting.

Follis wants us to know that the D.E.A. is as wily and tough as the

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drug traffickers it is sworn to catch:

"Great shop you've got—I hear you do nice work," I said, turning to admire some of the luxury cars and SUVs they were kitting out.

"Yeah," Ivan Espinoza said, stroking his sparse goatee.

"I also do *nice* work," I said, offering a half smile.

"That's what we hear."

This is Follis describing the time he posed as an L.A. private eye turned hit man, hoping to be hired by a pair of Mexican drug traffickers looking to assassinate a D.E.A. special agent. Follis was in full private-eye-turned-hit-man costume: long ponytail, black loafers, button-down shirt, dress slacks. He continues:

Wasn't the first time I'd played the role of a hit man. When you're selling yourself as a killer for hire, you never start off saying anything too direct—"I can body that guy" or even "I can do him." That'll raise the bad guys up instantly.

You speak in an understood criminal code: innocuous-sounding phrases, half-finished statements, and knowing glances.

"I hear you have some *issues* here," I said. "Heard you have an infestation."

They nodded, warily.

I kept glancing around the tinting shop. "I'm the kind of guy—Well, I know how to *eradicate* disease."

"Yeah?"

In the 1964 essay "The Paranoid Style in American Politics," the historian Richard Hofstadter described the psychological characteristics of what he called "movements of suspicious discontent." Such groups, he said, share an interpretation of history centered on personality. They focus on people, not systems, and the object of their suspicion is "clearly delineated: he is a perfect model of malice, a kind of amoral superman—sinister, ubiquitous, powerful, cruel, sensual, luxury-loving."

Hofstadter observes, "It is hard to resist the conclusion that this enemy is on many counts a projection of the self; both the ideal and the unacceptable aspects of the self are attributed to him," and he goes on:

The Ku Klux Klan imitated Catholicism to the point of donning priestly vestments, developing an elaborate ritual and an equally elaborate hierarchy. The John Birch Society emulates Communist cells and quasi-secret operation through "front" groups, and preaches a ruthless prosecution of the ideological war along lines very similar to those it finds in the Communist enemy. Spokesmen of the various fundamentalist anti-Communist "crusades" openly express their admiration for the dedication and discipline the Communist cause calls forth.

The paranoid crusader is not disdainful of his enemy. He is in awe of him. Hofstadter quotes that staunchest of cold warriors, Barry Goldwater: "I would suggest that we analyze and copy the strategy of the enemy; theirs has worked and ours has not."

Follis began his career in the Marines, and the Marines operate by very different principles from those of the D.E.A. In a fascinating history, "Underdogs: The Making of the Modern Marine Corps" (2012), the historian Aaron O'Connell points out that, before the United States entered the Second World War, the Marine Corps was the least popular branch of the military services: only five per cent of young men considering a military career listed the Marines as their first choice. In response, members of the Corps's leadership embarked on a course of identity creation. Working with Hollywood and the media, they recast the Corps's reputation for boorishness and violence as an ethic of courage and loyalty. The Navy and the Army talked about equipment and technology; the Marines talked about character. The Army, by the end of the war, was known for its impersonal bureaucracy. The Marine Corps made itself the most family-friendly of the services, reaching out to the wives and the parents of enlisted men. Toys for Tots—which became one of the biggest children's charities in the country—was a Marine Corps operation. O'Connell writes, "They privileged the collective over the individual, venerated sacrifice and suffering, and spoke often of their service's unique sense of community." The Marine Corps advanced its goals by differentiating itself from its competitors and adversaries.

But undercover work—which Follis believes to be at the core of the D.E.A.'s mission—is based on assimilation, not differentiation. The father of undercover police work, the early-nineteenth-century French detective Eugène-François Vidocq, was a former criminal. He began by selling his talents as an informer to the Paris police

on the ground that it took a thief to catch a thief. When he formed the Sûreté Nationale—the plainclothes state-security police—he staffed it heavily with other ex-cons. Covert police action is based on the notion that sophisticated criminals operate according to a code and a logic that are inaccessible to an outsider. The criminal is brilliant and devious. We need to look and think like him in order to catch him. *Theirs has worked and ours has not.* Undercover policing, in its idealization and emulation of the objects of its suspicion, is paranoid.

In "The Dark Art," all of Follis's targets are amoral supermen. "He carried himself like a true Ibo prince: dignified, impeccably dressed in a tailored tan suit and gleamingly shined oxblood shoes," Follis writes of a Nigerian drug dealer. We are told that Dragan, the young Rutger Hauer, had a doctorate. He came to one meeting wearing a "hand-tailored suit, with Italian loafers, striped silk tie." Follis befriends a heroin trafficker turned D.E.A. informant known as Philip the Armenian: "Nobody I'd then met—and nobody I've met since—had the connections, the savvy, and the swagger of this guy. The Armenian was highly educated, knew seven languages—all of them like a native-born speaker." It was through Philip the Armenian that Follis met Kayed Berro, who, he says, was then living in Southern California, finishing up a master's degree in engineering at U.S.C. while running a vast heroin operation.

Follis would tail Berro from his house to the engineering library on the U.S.C. campus and sit patiently outside, awed by the long hours that his quarry spent there. Berro's wife was an opera buff. He dressed beautifully. "He was a Lebanese Renaissance man," Follis writes. "He spoke flawless English, and his Arabic was about as beautiful as any Arabic I've ever heard."

To catch a man like Berro, you have to enter Berro's world. "I knew I could match Kayed Berro's smarts and sophistication, with a dose of my own street swagger," Follis says. So he pulled his hair back in a ponytail again, and, from the D.E.A.'s fleet, picked out a candy-red Corvette that had once belonged to a major heroin dealer. "Driving it at high speeds on the freeway made me *feel* like a major trafficker," he writes. Berro and Follis became friends. They shared confidences. "I've thought about it a lot in the intervening years," Follis says. "What I admired about him, I suppose, is that I saw a lot of *me* in him." *It is hard to resist the conclusion that this enemy is on many counts a projection of the self.*

Later in "The Dark Art," Follis mentions something that happened when he was making a case against the Juárez cartel, in Mexico. Through one of his informers, he procured nine "crystal clear" audiotapes of two of the cartel's leaders. Then the D.E.A. brass in Virginia accused him of staging the tapes, "complete with fabricated voices." Follis shrugs off the episode. But it shows the extent of the paranoid culture at the D.E.A. Apparently, it was not difficult for Follis's bosses to imagine that one of their most trusted agents might be tempted to slip into the role of Mexican drug lord. Nor was it difficult for them to imagine that someone versed in "the dark art" of undercover work could pull it off—could write, act in, and produce a nine-part set of audiotapes in which he staged the private conversations of two of Mexico's biggest narcotics kingpins. You almost wonder whether Follis took the accusation as a compliment.

In 2006, the job of D.E.A. country attaché in Afghanistan opened up. Everyone in Follis's family urged him not to apply. But Osama bin Laden was thought to be in Afghanistan, and Follis saw the country as ground zero in the war on drugs and terrorism. He woke one morning with a clear resolve:

You know what you need to do. If you have any chance to do this guy, Ed, . . . you've got to do this. Everyone else wants you to put your career first, but you've got to go to Kabul.

Afghanistan occupies a peculiar place in the international drug trade. As recently as 1980, it accounted for just two hundred metric tons of opium—a tiny fraction of the world's production. That number rose to fifteen hundred and seventy tons in 1990, after the chaos of the Soviet occupation. But it was in the wake of the U.S.-led invasion of Afghanistan that the country's position as the world's center of









opium production was solidified. By the time Follis got to Kabul, the country's opium production was more than eight thousand tons a year—more than ninety per cent of the global output.

In a recent paper, three Norwegian economists—Jo Thori Lind, Karl Ove Moene, and Fredrik Willumsen—argue that there is a direct connection between war and the surge in Afghanistan's drug economy. "Opium is more drought resistant than wheat, the main alternative crop, and opium does not require road transportation," they write. "Military activities that destroy infrastructure such as irrigation and roads therefore make opium relatively more profitable." The three prove their point by showing that, the more fighting there was in any particular region, the likelier its farmers were to switch from wheat to opium.

Because a large share of the opium profits were flowing to the Taliban, the United States instituted efforts to reduce opium production. But, as the economist Jeffrey Clemens has shown, those efforts were most effective in government-controlled areas and least effective in Taliban-controlled areas. So, as the U.S. spent more to eradicate poppies and to encourage farmers to plant other crops, the share of the opium trade that went to the Taliban increased. In 2004, Taliban regions accounted for forty per cent of Afghanistan's poppy production; by 2010, that share had risen to ninety per cent. In other words, the fighting in Afghanistan accelerated the country's drug trade, which enriched the Taliban, which caused the U.S. to launch an effort to eradicate poppy cultivation, which enriched the Taliban still further, which caused the U.S. to step up its assault on the Taliban's territory, which caused more farmers in Taliban territories to switch from wheat to opium, which accelerated the drug trade.

This was the mess that Follis inherited when he arrived in Afghanistan. But in "The Dark Art" there is little consideration of the broader context of the war on drugs. When Follis describes his work in Mexico, he speaks of the fact that many tens of thousands of Mexicans have been killed in the drug war there. It never occurs to him that the war on drugs, which had consumed his whole career, might have contributed to that violence. In Afghanistan, his job was to control a drug trade fuelled in part by his own country's attempts to control the drug trade. But that paradox does not seem to interest him. As Hofstadter writes, "The paranoid's interpretation of history is distinctly personal: decisive events are not taken as part of the stream of history, but as the consequences of someone's will." Follis's world is not shaped by markets and incentives and institutional choices. It is the product of bad guys in fast cars and sharp outfits.

So what does Follis do in Kabul? He ends up befriending one of the baddest of all Afghanistan bad guys, a "mountain of a man" named Haji Juma Khan Mohammadhasni. HJK, as Follis calls him, was a close associate of Osama bin Laden and Mullah Omar. The D.E.A. suspected him of giving hundreds of millions of dollars to the Taliban. Follis would meet him for long dinners at HJK's favorite Persian restaurant in Kabul, where HJK would eat one kebab after another and speak learnedly of Afghan history and culture. When HJK had a cancer scare, Follis whisked him to Washington for treatment. They watched "The Passion of the Christ" together on Follis's laptop. They talked about God and their faith and puzzled over Jesus' saying, "My father, if it is possible, let this cup pass from me."

"Strange as it sounds, the hours I spent undercover with HJK were becoming a source of solace: an escape from the stress of embassy politics, the constant infighting and war of wills," Follis writes. As embassy life grew more strained, he began to have fantasies of a simpler existence: "Half waking, half dreaming, in my single bed in the embassy, I could see myself running away to live the rest of my life with HJK."

When one of the top C.I.A. agents in the region accused Follis of withholding crucial intelligence that he had gleaned from his undercover sources, Follis came close to the brink. HJK would never treat him that way:

> Little wonder then that I'd lie there in my Spartan bedroom almost every night, dreaming of running away with HJK, lost in clouds of desert dust, rolling through those badlands in caravans of SUVs. Sounds strange but—compared to the amorality and treachery of these spooks—I felt more at ease in the world of guys like HJK. . . .
>
> There was a warmth to his manner, openness in his laughter, a sophisticated charm. A skeptic could say that it was *all* charm—a master manipulator at work. But I'd like to believe there was something deeper at play.

Follis watched HJK fingering his iridescent prayer beads and recalled the hours he'd spent with his rosary beads, growing up in St. Louis: "I'd inwardly smile as he did it, too, thinking, *This guy is just a version of me.*"

The final section of "The Dark Art" is entirely about the unravelling of Follis's relationship with HJK. Follis learns that the Pentagon has put HJK on its hit list. Frantic, Follis asks for ninety days. He gets sixty. He telephones HJK and tells him to come to Jakarta. The D.E.A. charters a Gulfstream V. The two friends meet at the airport and share a bittersweet reunion, and then Follis hustles HJK onto the Gulfstream for the long ride back to the United States, where he arrests him. "I have to take his life away from him to *save* his life," Follis explains. (HJK has contested the charge against him and is awaiting trial.)

Culture, O'Connell writes, serves to differentiate and discipline: "it operates by policing the boundaries within and between groups. It provides signs and rules for what is 'inside' or 'outside,' normal or abnormal." But undercover cultures have no signs and rules, no bright line between normal and abnormal. The hunter dresses like his prey. They fall in love. And, when the relationship comes to an end, hearts are broken.

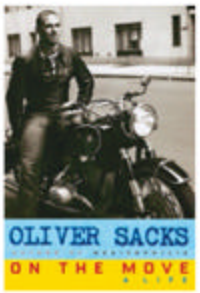
"In my right ear I felt the kiss-like warmth, his breath faintly scented with roasted cauliflower and jasmine tea," Follis writes of a cherished moment that he and HJK spent together. They were in a mosque in Kabul. They had prayed, side by side, on their knees, for more than an hour. Then HJK—alleged opium king and friend of the Taliban—embraced him:

> For the first time he used the Dari word to address me.
>
> *Baradar*.
>
> Even today, I can feel the wiry barbs of his black beard pressing into my cheeks.
>
> "You're more than a friend, Ed," he said. "I love you today as my brother." ♦

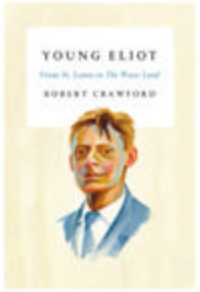
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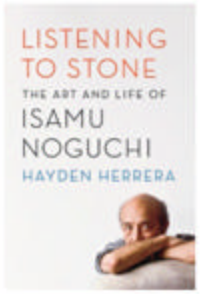
SPEAK NOW, *by Kenji Yoshino (Crown)*. In June, the Supreme Court is expected to issue its ruling in Obergefell v. Hodges, likely deciding the question of whether there is a constitutional right to marry in all fifty states. Yoshino provides an engaging primer on the law behind the case and on what same-sex marriage means across America (including in his own life, as a man with a husband and two children). While granting the importance of United States v. Windsor, which overturned the Defense of Marriage Act, he focusses on Hollingsworth v. Perry, an earlier attempt to establish a right to marry. The Court turned it back on procedural grounds but not before establishing a factual record on the benefits of marriage for, among others, the children of same-sex couples.



ON THE MOVE, *by Oliver Sacks (Knopf)*. In this absorbing memoir, the shy neurologist (who once described himself as a noble gas: terrified by the inability to form stable bonds) recounts his emergence, after moving from England to America, as a hitchhiker, power lifter, and biker. He chronicles literary and clinical achievements, but the most memorable sections are more intimate—descriptions of an enthralling road followed during a cross-country motorcycle trip or of the "deep, almost geological changes" when he fell in love with his current partner, Billy Hayes. Sacks has spent his career reminding clinicians to consider "the whole pattern, the context, the economy" of a patient's life. Now facing the end of his own (he has terminal cancer), he accords himself the same compassion.



YOUNG ELIOT, *by Robert Crawford (Farrar, Straus & Giroux)*. This comprehensive study of T. S. Eliot's first thirty-four years humanizes one of the twentieth century's most learned and inscrutable poets. Crawford follows Eliot from happy, sheltered childhood in America to stardom on the British literary scene after the First World War. The culmination of these formative years is "The Waste Land," and suggestions of influences on it build throughout the book. Crawford pays special attention to Eliot's first wife, Vivienne, who suffered from mysterious ailments. Their marriage difficulties made Eliot ill, but Crawford points to these periods of illness as his most productive, and suggests that Vivienne—a sort of accidental muse—may have provoked suffering vital to the creation of his masterpiece.



LISTENING TO STONE, *by Hayden Herrera (Farrar, Straus & Giroux)*. The sculptor Isamu Noguchi spent his early life without a sense of belonging: born in California, the child of a Japanese poet and an Irish-American woman from New York, he grew up in Japan and was educated in the Midwest and in New York. He spent much of his career trying to reconcile his Japanese heritage with a life lived elsewhere, bringing Japanese principles of simplicity to his work: sculptures, rock gardens, set designs for Martha Graham. This biography, tracking his swift ascent and his numerous love affairs, leaves the impression that the only real stability in his life was his art.


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BOOKS

ANATOMY OF ERROR

A surgeon remembers his mistakes.

BY JOSHUA ROTHMAN



Bicycling to the hospital, Henry Marsh writes, he is oppressed by "a feeling of doom."

TOM PILSTON/PANOS

For the schoolteacher, the changes had come slowly. First, his walking had grown unsteady; then his hearing had worsened. He had become stooped, and had begun walking with a cane, even though he was only in his late fifties. Now he sat with his wife and son in the consulting room of Henry Marsh, a London neurosurgeon, looking at a scan of his brain, which showed a tumor growing near the base of his skull. The question was whether it could, or should, be removed. Marsh, who had been practicing neurosurgery for only a few years, was unsure. The tumor was massive—he was startled by its size—and it was situated in the brain stem, a vital area. Left to itself, it would destroy the schoolteacher's hearing, rob him of his ability to walk, and, eventually, kill him. But, Marsh explained, surgery could leave him paralyzed, or worse. The family faced a difficult choice, between the certainty of a slow, predictable decline and the possibility of an immediate cure—or catastrophe.

They decided to seek a second opinion from an older, eminent neurosurgeon. A few days later, the surgeon phoned Marsh. "It's a young man's operation," he said. "I've told them you should do it." Flattered, Marsh agreed to go ahead. The surgery began at nine in the morning and continued late into the night. Brain surgery is slow and dangerous, and removing a tumor can be like defusing a bomb. Often, surgeons look through a microscope and use long-handled, fine-tipped instruments to pull the tumor away from the brain before removing it with a sucker. A quarter of the body's blood courses through the veins and arteries of the brain; if one of them is torn, bleeding and stroke can result. It's also possible to remove important parts of the brain by accident, because brain tissue and tumor tissue look pretty much the same. Unlike the rest of the body, the brain and the spinal cord rarely heal. If a neurosurgeon makes a mistake, the damage is often permanent.

By midnight, Marsh and his team had removed almost all of the tumor. The atmosphere in the operating theatre was relaxed and celebratory; the surgical team paused for cigarette breaks and listened to Abba and Bach. "I should have stopped at that point, and left the last piece of tumor behind," Marsh writes in his memoir, "Do No Harm" (Thomas Dunne). Instead, he ventured further—he wanted to be able to say that he had taken it all out. "As I started to remove the last part of the tumor," Marsh writes, "I tore a small perforating branch off the basilar artery, a vessel the width of a thick pin. A narrow jet of bright red arterial blood started to pump upwards." The basilar artery carries blood to the brain stem, which regulates the rest of the brain. Marsh quickly stopped the bleeding, but the oxygen deprivation was enough to irreparably damage the man's brain stem, and he never regained consciousness.

Marsh, who is now sixty-five, is one of Britain's foremost neurosurgeons. He is a senior consultant at St. George's Hospital, in London, and he helped to pioneer a kind of surgery in which patients are kept awake, under local anesthesia, so that they can converse with their surgeons while they operate, allowing them to avoid damaging what neurosurgeons call "eloquent," or useful, parts of the brain. Marsh has been the subject of two documentary films. Still, he writes, "As I approach the end of my career I feel an increasing obli-

gation to bear witness to past mistakes I have made." A few years ago, he prepared a lecture called "All My Worst Mistakes." For months, he lay awake in the mornings, remembering the patients he had failed. "The more I thought about the past," he recalls in his book, "the more mistakes rose to the surface, like poisonous methane stirred up from a stagnant pond."

There's a tradition of physicians writing about their errors. "When the Air Hits Your Brain," a neurosurgical memoir by Frank Vertosick, Jr., begins with a scene in which a resident, while drilling a hole in a man's skull, accidentally goes too far, plunging the drill bit into the brain. "Oh, shit!" he exclaims. (An older doctor reassures him: "It's just the lateral hemisphere.") Physician writers usually view such errors with a generous spirit. They point out that medicine is built on mistakes, because doctors, like the rest of us, learn by screwing up.

Marsh isn't interested in the usefulness of error. He is the Knausgaard of neurosurgery: he writes about his errors because he wants to confess them, and because he's interested in his inner life and how it's been changed, over time, by the making of mistakes. As an epigraph to "Do No Harm," he quotes the French doctor René Leriche: "Every surgeon carries within himself a small cemetery, where from time to time he goes to pray." Marsh knows there's something unprofessional about this inwardness—a surgeon's emotions are supposed to be beside the point compared with his patients' suffering—but he is drawn to "reckless honesty." (When he delivered "All My Worst Mistakes" to an audience of neurosurgical colleagues, he writes, "it was met by a stunned silence and no questions were asked.") "Do No Harm" is an act of atonement, an anatomy of error, and an attempt to answer, from the inside, a startling question: How can someone spend decades cutting into people's brains and emerge whole?

Marsh became a neurosurgeon almost by accident. Midway through his undergraduate years, at Oxford, he fell in unrequited love and, inspired by the Jack Nicholson movie "Five Easy Pieces," fled to Newcastle, in the rugged northeast of England, to nurse his broken heart. There, he wrote bad poetry, worked as a hospital porter, and saw his first surgery. "I found its controlled and altruistic violence deeply appealing," he writes. After he finished his degree, in 1973, he entered the Royal Free Hospital School of Medicine. Students weren't allowed into the neurosurgical theatres, but one day Marsh caught a glimpse through a round porthole in a closed door—"a naked woman, anaesthetized, her head completely shaven, sitting bolt upright on a special operating table." The image stayed in his mind, and struck him as "a scene from a horror film."

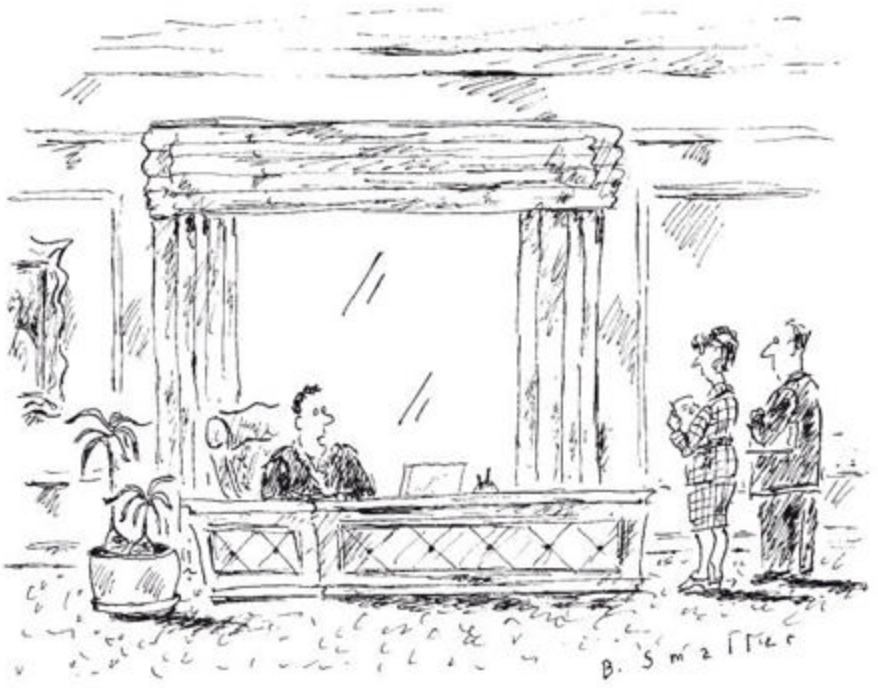
Marsh married, and qualified as a doctor. Not long afterward, his three-month-old son, William, developed a tumor in the center of his brain and successfully underwent surgery to remove it. Marsh feels now that he didn't fully appreciate the risks: he writes that, much later, "I watched a child bleed to death in the very same operating theatre where my son had been treated, as my boss—the very surgeon who had saved my son's life—now failed with a similar tumor." Soon after his son's surgery, while working in intensive care, Marsh observed an aneurysm operation. The surgeon had to make his way deep into the brain, exposing the small, deadly balloon of arterial blood so that, without rupturing it, he could seal it off using a miniature metal clip. It "was more like a blood sport than a calm and dispassionate technical exercise," Marsh writes. It also "involved the brain, the mysterious substrate of all thought and feeling. . . . The operation was elegant, delicate, dangerous, and full of profound meaning. What could be finer, I thought, than to be a neurosurgeon?" Neurosurgery—strange, brutal, and miraculous—had seduced him, and he started the training as soon as he could.

Marsh is fascinated by the brain. He loves looking at it through his counterbalanced surgical microscope, which "leans out over the patient's head like an inquisitive, thoughtful crane." To Marsh, the view is beautiful. At the center of the brain, he writes, the internal cerebral veins are like "the great arches of a cathedral roof"; the Great Vein of Galen can be seen "dark blue and glittering in the light of the microscope." It is "a very private view," "clearer, sharper and more brilliant than the world outside," and "made all the more intense and mysterious by my anxiety."

That anxiety begins long before surgery, with the decision to operate in the first place, which could easily be wrong. (A brain scan is mute on the all-important question of how tightly a tumor will cling to the brain.) It continues through a series of meetings in which Marsh must try to explain that uncertainty without alarming his patients. (It's tempting to be reassuring, he writes, but after failed operations he has "bitterly regretted having been too optimistic.") Bicycling to the hospital, Marsh is oppressed by dread—"almost a feeling of doom"—and, before surgery, he is often seized by panic, which is swept away, at the last moment, by "fierce and happy concentration."

Brain surgery itself, Marsh writes, is "something I hate doing." Beforehand, patients are depersonalized—their heads are shaved, and they are covered in sterile drapes—although you can't entirely depersonalize the brain. Often, there's a question about how far to go: if an aneurysm clip is not quite perfectly positioned, should Marsh take the risk of repositioning it? To do so, he must struggle against the "urge to finish the operation and escape the fear of causing a catastrophic haemorrhage." Eventually, he writes, "I decide at some unconscious place within myself, where all the ghosts have assembled to watch me."

Neurosurgical disasters can be cruel. A patient can wake up and appear healthy only to die, a few days later, of a stroke or a hemorrhage that's related, in "some unknowable way," to the operation. And patients can live on despite severe brain damage—an outcome that's a particular source of fear for Marsh. He tells a colleague, "Nobody, nobody other than a neurosurgeon, understands what it is like to have to drag yourself up to the ward and see, every day—sometimes for months on end—somebody one has destroyed and face the anxious and angry family at the bedside." The schoolteacher lived on in just this way. Seven years after that failed surgery, Marsh was visiting a home for vegetative patients when he looked into a room and "saw his grey curled-up



"I've made my fortune, and now it's time for me to run for office and consolidate it."

• •

body in its bed." Of the feelings such experiences produce in him, Marsh writes, "I will not describe the pain."

In his decades of medical practice, Marsh has been a witness or a party to almost every kind of mistake. There are errors of commission (the hubristic removal of too much tumor) and of omission (the missed diagnosis). There are errors that go unreported (after a successful surgery, Marsh might decide not to tell a patient about a close call) and errors for which Marsh is held accountable. (He writes that, after one operation, "I told them to sue me. I told them I had made a terrible mistake.") There are errors of delegation—as when Marsh allows a resident to perform a simple spinal surgery, and the patient is left with a paralyzed foot—and historical errors: at a mental hospital, Marsh encounters victims of lobotomy. One morning, Marsh operates after having a petty argument with another surgeon, and the operation paralyzes half the patient's face. He writes, "Perhaps this was going to happen anyway—it is called a 'recognized complication' of that particular operation—but I know that I was not in the right state of mind to carry out such dangerous and delicate surgery, and when I saw the patient on the ward round in the days afterwards, and saw his paralyzed face, paralyzed and disfigured, I felt a deep sense of shame."

In a 1976 essay, the philosopher Bernard Williams explored a concept that he called "moral luck." Often, he observed, we are morally responsible for actions that contain an element of chance. Imagine two people who drink too much at the same party, and who both drive home drunk; suppose that one of them hits a pedestrian. The driver in the accident is morally responsible for this outcome, and yet only chance distinguishes him from the other driver. Much of moral life, Williams thought, contains a similar element of luck. We happen to find ourselves in situations that bring judgment upon us. Yet this doesn't absolve us of responsibility for what we do. It underscores an unsettling fact about moral life—that the distribution of moral fault in the world depends, in many ways, on good and bad luck.

A soldier's life is deeply shaped by such moral luck. So, it turns out, is a neurosurgeon's. "As I become more and more experienced it seems that luck becomes ever more important," Marsh writes. Even so, he will be blamed for what goes wrong and praised for what goes right—treated as a murderer in the morning, by one family, and as a savior in the afternoon, by another. People who are regularly exposed to moral luck often find it helpful to have some standard other than morality by which to judge themselves—a code, more or less. Marsh's code has to do with his own emotions. If he can't control how a surgery turns out, he will control how he feels. He tries not to let his feelings add to his patients' fear and unhappiness; at the same time, he tries never to lie. He yearns, therefore, for feelings that are strong but realistic, fully voiced yet even-keeled. In one of the book's most moving passages, he is called to the bedside of a favorite patient, David, a warm, accomplished, and intelligent man, whom he has known for twelve years. Marsh has fought David's tumor in three surgeries, but now it has reached a deeper, fatal stratum of the brain. Marsh explains, with great sadness, that a fourth operation won't do any good; David says that he's suspected as much. Marsh holds David's hand, is embraced by his wife, and says, "It's been an honor to look after you."

Given the circumstances, it's an ideal meeting. And yet, afterward, Marsh's emotions rebel. Leaving the hospital, he writes,

> I quickly became stuck in the rush-hour traffic, and furiously cursed the cars and their drivers as though it was their fault that this good and noble man should die and leave his wife a widow and his young children fatherless. I shouted and cried and stupidly hit the steering wheel with my fists. And I felt shame, not at my failure to save his life—his treatment had been as good as it could be—but at my loss of professional detachment and what felt like the vulgarity of my distress compared to his composure and his family's suffering, to which I could only bear impotent witness.

In writing "Do No Harm," Marsh has seemingly violated his code: he expresses many of the feelings that he's worked very hard to keep hidden. But codes, by their nature, exclude the complexities of inner and moral life, and Marsh wants to understand himself—and wants us to know him—in the light of those complexities.

Marsh writes like a novelist—he thinks in terms of scenes, patterns, and contrasts—and, reading "Do No Harm," I thought of another Henry: Henry Perowne, the neurosurgeon

protagonist of Ian McEwan's novel "Saturday." (In writing his book, McEwan shadowed a younger English neurosurgeon, Neil Kitchen.) The two Henrys could not be more different. Perowne, who is in his late forties, is confident and optimistic. In his surgeries, he says, he can "control outcomes"; he experiences "the pleasure of knowing precisely what he's doing." He admires the impersonality of scientific knowledge. He enjoys "the relief of the relatives when he comes down from the operating room like a god, an angel with the glad tidings—life, not death." Most of his patients survive, and even, McEwan writes, "thrive." Presumably, the same is true of Marsh's patients. The difference is one of temperament. "It's not the successes I remember," Marsh writes, "but the failures."

Years ago, when I read "Saturday," I was in awe of Perowne. Now that I've read Marsh's memoir, the character comes across as curiously unburdened by his work. (The novel imagines Perowne humbled, but by forces—time, evil, history—that lie outside the surgical theatre.) Perowne has, apparently, never done what Marsh did to the schoolteacher, whose story Marsh tells in a chapter called "Hubris." That experience changed Marsh, professionally and spiritually. He no longer operates for so long at a stretch. He has become wary of his own optimism and talent, and suspicious of the exhilarations of surgery. ("I can no longer bear to listen to music while operating," Marsh writes; Perowne listens to the Goldberg Variations.)

The Henry Marsh of "Do No Harm" is a character, too. In 2007, the documentarian Geoffrey Smith made a film about Marsh, titled "The English Surgeon." It seems to star a slightly different man. In the film, Marsh is goofy; he's very tall, and wears bold, perfectly round glasses. When he talks about medical equipment, he becomes boyish. At a frozen lake—the documentary takes place in Ukraine, where Marsh has been doing pro-bono brain surgery for decades—he slides across the ice with ease. If he's nervous before an operation, his voice rises and he grabs his head. He smiles regularly. When he delivers bad news, his eyes fill with tears: "Life can be very cruel," he says, "I'm sorry." It's obvious that he's an emotional man—the sort who might leave school to nurse a broken heart. At one point, Marsh visits Katya, the mother of a young girl whose life he tried to save. Marsh describes the scene in "Do No Harm": sitting at her dinner table, surrounded by her family, "I was so intensely moved to see Katya again that I could scarcely talk," he writes. It's remarkable that such a sensitive man has become a brain surgeon. There, too, age may play a role: "I became hardened in the way that doctors have to become hardened," Marsh writes, but "now that I am reaching the end of my career this detachment has started to fade."

In Kiev, Marsh works with a neurosurgeon named Igor Kurilets to perform state-of-the-art procedures with secondhand surgical equipment. In "Do No Harm," Marsh writes about the terror of operating in a strange place, with substandard equipment, but he can't quite bring himself to describe his work there accurately. (It's heroic.) His self-portrait, in short, leaves something out. Marsh writes that, when speaking with patients, he struggles to find the balance between "hope and reality," "optimism and realism," "detachment and compassion." He also struggles to find that balance in writing about himself.

Why should that be? The darkness of Marsh's book isn't a kind of false modesty; his self-abnegation isn't disguised self-regard. Instead, his desire for atonement seems to darken his recollections—faced with the irrevocability of his patients' suffering, he is unable to escape from its shadow. And the memoir's final chapter suggests a further possibility. Marsh writes about a woman who comes to see him in his clinic. Twenty years earlier, she had a benign brain tumor removed; even as the operation saved her life, it severed one of her facial nerves. Surgeons call this kind of trade a "sacrifice." In most people, the result of this sacrifice would be a numbness of the face, with which they come to terms. Only a few, Marsh writes, are, like the woman, "driven mad by the numbness." The Latin name for this, he says, is "*anaesthesia dolorosa*—painful loss of feeling"; the final chapter is named for that condition. Marsh, I think, is afraid of *anaesthesia dolorosa*. He can't bear the thought of going numb. He is determined to feel as much as he can. ♦

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DISTANT EMOTIONS

"Good Kill" and "Slow West."

BY ANTHONY LANE



Ethan Hawke plays a drone pilot in a movie directed by Andrew Niccol.

After having flown three thousand hours in an F-16, U.S. Air Force Major Tommy Egan (Ethan Hawke), the protagonist of "Good Kill," is again a man on a mission. Once more, he is engaging with forces considered hostile, this time across zones as far apart as Afghanistan and Yemen. His prowess, like his strike rate, remains dependably high. We see the touch of his hand on the controls, and the push of his feet, as smooth as a pianist's, against the pedals. We hear brief exchanges with his colleagues, as a missile is launched: "Time of flight." "Ten seconds." We wait. "Splash"—the pilots' slang for a hit. A building bursts; a car explodes; a mustering of people is wiped out. "Good kill." When Tommy is done for the day, he gets up, walks to a door, and steps out into Nevada.

Tommy works in a portable metal hut, the size of a trailer, on a base not far from Las Vegas. He flies Unmanned Aerial Vehicles, better known as drones, guiding their path on another continent. It's a living, but he knows it's not much of a life. "Can you get me in a plane, sir?" he asks his superior, Colonel Johns (Bruce Greenwood). If "Good Kill" is to be believed, that's like a cavalry officer requesting a thoroughbred in the fall of 1914. Fighter planes stand idle in a row beside the runway, as if they were riderless horses. Our hero even drives a Mustang, for heaven's sake. As Johns, pointing out a drone, declares to new recruits, "The aircraft you are looking at is not the future of war. It is the here and fucking now."

The writer and director of "Good Kill" is Andrew Niccol, who teamed up with Hawke to make "Gattaca" (1997), about a future—or not so future—world in which DNA will be up for sale. Niccol also wrote "The Truman Show," and his penchant is for those porous borders where technology crosses furtively into human behavior and allows us to screw up in new and imaginative ways. Look at Tommy, who spends his days destroying other people at a distance, with apparent impunity, although the strain of it is punishment enough. He stashes vodka in the bathroom, and a cop in Vegas, stopping Tommy's car on the Strip, sees a bottle in the footwell. No one is more cramped than the action man whose freedom of movement has been snatched away, and Hawke, near-motionless for much of the film, registers the rise in pressure with his face. He purses his mouth, sucks in his cheeks, and drops his jaw, as if to show the skull beneath the skin. His eyes, beneath his crewcut, are raw and tight.

Hawke is on a roll right now, and "Good Kill" stirs him to another performance of cogency and zeal. Is it sufficient, however, to support an entire movie? Might we not enjoy his presence more if he were part of a pack, just as we relished every minute of Sam Shepard, as Chuck Yeager, when he fought for dramatic space in the jockish throng of "The Right Stuff"? Other folk are barely a blip on Tommy's mental radar: his fellow drone-operator Suarez (Zoë Kravitz), say, who comes on to him at a bar, without success, or his wife, Molly (January Jones), who says to him, "You look miles away." She pauses, and adds, "Seven thousand." Another pause, and then: "That's a joke." Why didn't she stop after the first line, leaving it to hang fire? Time and again, the film strains to insure that its meaning is as clear and as cloudless as the Nevada skies. The chief explainer is Johns, who, for all the foulness of his mouth, shepherds us through the arguments that beset the use of drones, both for ("Of all the bad options, we're the least bad") and against ("Used to be, we go to war with a country, we'd actually go to the country"). Thanks to this movie, you can meet with friends for dinner and talk passionately about depersonalized conflict, collateral damage, and modes of modern imperialism, until everyone just leaves.

In short, viewers of "Good Kill" may end up like Tommy—sad, stunned, lonesome, and boxed in. The identical houses in which the airmen dwell are occasionally filmed from above, as if they, too, were potential bull's-eyes. (Not that they will be attacked any time soon, but the image fits the mood.) The irony is that the movie flowers into life only in the metal cube from which Tommy and Suarez take aim. We get a fresh

ILLUSTRATION BY SIMON PRADES

subplot, as responsibility for targeting is passed from the Air Force to the C.I.A. ("Christians in Action," as Johns refers to them), while some of the shots beamed back from the U.A.V.'s cameras, click by click, exert a horrible fascination. Niccol is roused less by the moral quandaries of drone deployment, I think, than by the sheer sensory oddity of this new ritual, with its compound of monkishness and mayhem. If you crave more, try the Public Theatre, where George Brant's play "Grounded," in a production by Julie Taymor, stars Anne Hathaway as a kind of female Tommy—an experienced pilot, now wiping out the foe at a remove. (Guess what: it's a solo show.) You can see why playwrights, filmmakers, and other creative souls will continue to be drawn to the drone. It's almost too convenient an emblem of alienation, and it saves the producer—like the military commander—the overwhelming nuisance of staging an actual battle. Ground control *is* Major Tom, and he's here to stay.

The great news about "Slow West" is that it's eighty-four minutes long. I saw the title and braced myself for a three-hour prairie trek, with balls of tumbleweed in supporting roles. Instead, we have a lean fable, set in 1870, about a sixteen-year-old Scottish lad named Jay (Kodi Smit-McPhee), who travels to America in search of Rose (Caren Pistorius), his one true love. Jay's belongings include a teapot and a book entitled "Ho! For the West!!," and his survival skills amount to precisely nil. He even flunks the cracking of an egg. Out of a pine forest comes a lone rider, Silas (Michael Fassbender), who offers to chaperone him through the wilderness to Colorado, where Rose is said to bloom. Cost: a hundred bucks.

The casting is capricious. Scotland is played by Scotland, in recurrent flashbacks that I do not claim to understand, but Colorado is played, more alluringly than convincingly, by New Zealand. The mountains that ring the horizon may strike a chord with some filmgoers, who will be disappointed not to see Gandalf gliding by on the back of a giant eagle. As for Jay, I accept that he is meant to be far from home, but does Smit-McPhee—soon to appear as Nightcrawler in the next "X-Men" movie, whatever that entails—need to look *quite* so blank and lost? Upon reaching his destination, he declares, "I've made it," in the tone that you or I would use to announce that we had successfully fed a cat.

All in all, plausibility is not a strong suit of the film, which is happy for its heroes to stay fast asleep, in the open air, as a rainstorm rages about them. That, you could argue, has the earthen charm of folklore, as does Fassbender's brisk plundering of a corpse, but so much else feels slightly off—rum little scenes that chip into the action, as with the trio of black singers, discovered in the middle of nowhere, who perform in French and provoke, from Jay, the gnomic observation that "love is universal, like death." As for the smiling anthropologist, busy collating information on Native American tribes, who looks exactly like one of the guys—or, in fact, both guys—from Abba, what's he doing here?

And yet, just as your attention starts to wander, "Slow West" pulls it up short. The director is John Maclean, making his début, and, if he demonstrates how hard it is to handle whimsy, he more than atones for it with two tremendous set pieces—one in a store, and the other in an isolated homestead, girded with cornfields where a shooter can nestle and hide. Both sequences involve spurts of multiple gunplay, which, as we know from an average week at the movies, or in front of the TV, is liable to trigger all manner of stylistic folly; but Maclean holds his nerve, and somehow finds order in the uproar. Rose, who enters the film in its final stretch, turns out to have adapted to the ways of the West—and to the workings of a rifle—far better than Jay, the eternal greenhorn, ever could. We should have seen more of her before.

Best of all, when the smoke has cleared, Maclean then reckons up the dead, not only from a single shoot-out but from "Slow West" as a whole. Each body is framed in turn, without comment or accompaniment; one with a banjo by his side, another with an axe, and so on. It as is though, late in the day, at the close of a lightweight tale, Maclean were seeking to fulfill the basic duty of a period drama, by reminding us: this is how it was, in this place, in that small span of history. Lives didn't weigh so much, back then, so why not take a moment to honor them now? As the anthropologist says, "In a short time, this will be a long time ago." ♦

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Richard Brody blogs about movies.

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CARTOON CAPTION CONTEST

Each week, we provide a cartoon in need of a caption. You, the reader, submit a caption, we choose three finalists, and you vote for your favorite. Caption submissions for this week's cartoon, by Frank Cotham, must be received by Sunday, May 17th. The finalists in the May 4th contest appear below. We will announce the winner, and the finalists in this week's contest, in the June 1st issue. The winner receives a signed print of the cartoon. Any resident of the United States, Canada (except Quebec), Australia, the United Kingdom, or the Republic of Ireland age eighteen or over can enter or vote. To do so, and to read the complete rules, visit contest.newyorker.com.

THE WINNING CAPTION



"I feel like I'm still at the office."
Deborah Madsen, Salt Lake City, Utah



THE FINALISTS

"They seem too skinny for carb-based life-forms."
Thomas Asp, Seattle, Wash.

"Stay back! They may have gluten!"
Allison Hart Lengyel, Shaw Island, Wash.

"They can't be that advanced—there's no bagel setting."
David Onken, Milwaukee, Wis.

THIS WEEK'S CONTEST



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